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Notes and Comments

Chemistry and the Distressed Areas

WHEN the Special Commissioner for the Depressed Areas started his labours, a committee, representative of the Chemical Society, the Institute of Chemistry and the Society of Chemical Industry arranged with him to present a series of reports upon the North-East area giving their ideas and suggestions for steps that might be taken to improve the conditions in that area. One of these reports drawn up by Dr. J. T. Dunn and Professor G. R. Clemo has for its theme the plea that the bad conditions of the area have been due to the neglect of science by the manufacturers. It is admitted that no one reason will account for the decline but among the reasons "must be put the attitude of too many of the great local industrialists, as instanced by one who said that he had no use for any other technical education for his workers beyond that to be gained in his own workshops." It is suggested that the relative ease with which fortunes were made and businesses built up in the earlier days of the North-East iron and coal trades has resulted in a class of industrial "leaders" whose outlook has not moved far from the days of their grandfathers. Undoubtedly there is much that could be said in support of this view. We are acquainted with the type of industrialist that the authors have in mind, but it is doubtful whether the presence of a scientific staff within their gates would have been of the slightest use unless they themselves had been educated to make use of the new ideas these men would have brought. Rule of thumb still prevails in an astonishing number of works, but when we look around to take stock of the firms that have their works on that desolated coast, it becomes more than doubtful whether the neglect of science has had quite so large an effect upon existing businesses as the authors suppose. There is in that district many a firm that during the past ten or twenty years has opened its gates to science—and still the depression has come.

If the report in question be analysed carefully we fear it will create an impression less deep than its authors would have wished. Frankly it appears to us capable of being summarised in a sentence: "Here is Armstrong College, in which we are deeply interested, turning out its students by the dozen; why won't anyone employ them?" It is one of the most troublesome things in any professorial existence that, having accepted students, he feels morally bound to do his utmost to find them a suitable opening. The report analyses the careers of past students of the college, but we cannot see that the non-absorption of these men by the local industries has had much to do with the depression that has fallen upon the district. The basic industries, shipbuilding, iron and steel manufacture and coal, have been depressed for causes that the whole of Armstrong College and every other college in the country would have been powerless to avert. What value would have been a B.Sc. (Hons. Chem.) to a shipbuilding firm when the shipping of the world lay idle because no man had hired it? What could these men have done to obtain orders for a coal trade that was derelict because our export markets had deserted us? Other iron and steel firms in Lancashire, Yorkshire and Northamptonshire have modernised their plant and are going ahead; science cannot modernise plant without money.

Application of Scientific Methods

THE underlying idea of the report is thoroughly sound, even if it refers to measures which cannot take effect for another ten years or so. There is urgent need to act upon the basic suggestion that "general prosperity in these parts will be impossible without an extensive application of scientific methods to those industries which the local raw materials and situation make possible." If the district is to embark upon a policy of scientific development, it is also necessary to bear in mind the chemists' further note that "the greatest factor has been a narrow outlook which failed to see that industry is based on science, and that a policy which drains the profits and leaves insufficient reserve for research and development is ultimately doomed to failure." If the depressed areas are to start again to build up their shattered factories, and to start to some extent on new lines, it is necessary that there should be in charge of affairs men of the 1935 calibre, men who can take the long view and, while exercising all that caution which is so necessary in starting new ventures, will make use of scientific methods and will base their future developments on science—whether it be the science of chemistry, engineering, or of business management.

Among the steps that it is proposed to take are the local development of the pottery industry. There is plenty of clay in the area and it is contended that Continental hard porcelain, bricks, tiles and sanitary ware which are now imported in considerable quantities could be manufactured in the area. It is submitted that this would create a good deal of employment for unskilled labour. As a commentary upon the alleged lack of application of scientific work to industry in this district, it may be mentioned that the Consett Iron Co. has since the war commenced the manufacture of

silica bricks; 20 years ago silica refractories were so poorly catered for in England, and to some extent in Europe as a whole, that the British brick could only be used for second quality purposes. To-day the silica brick works of the Consett Iron Co. are among the finest in Europe. Apart from refractories, however, the Chemical Committee believes that some £400,000 worth of ceramic products could be made in the North-East area without interfering with what is being done elsewhere in the country.

A Promising Industry

IT is further maintained that all the necessary facilities are available for the establishment of a plastics moulding industry. Undoubtedly this is an industry of the right type to initiate in a distressed area because it is growing rapidly and as far as can be seen there is no limit to the possible expansion. The industry moreover provides an outlet for the artistic talent of the district in the design of new articles of commerce which can be made out of plastics; it also provides a field for research since plastic-ware for domestic uses, to take one example, is not yet perfect and considerable improvement should be possible, *e.g.*, in tea-cups which seem to absorb the tannin, to become rough and have to be discarded sooner than the equivalent porcelain ware. Glass, and particularly fancy ware, crystal, semi-crystal and cut glass, wine glasses, etc., which are largely imported from Belgium and Czechoslovakia, could be made to the extent of 30,000 tons per annum, "involving the consumption of 70,000 tons of coal and the employment of from 500 to 1,000 workpeople." An examination of the barium industry shows that the important asset of the district is witherite, of which mineral the district is said to be the world's chief source. Production of the two mines in operation could easily be doubled and it is suggested that financial assistance should be provided for research work at Armstrong College to provide new outlets. Probably, quicker and more practical results might follow if the great chemical industry now established at Billingham could be persuaded to examine the problem. The establishment of a gas grid is also recommended.

Nothing but good can result from examination of the possibilities of the district by experts in this way, and we could hope that other districts will be similarly examined by experts in that particular branch of technology. It would be no bad thing if the whole country could be examined so that the inception of new industries would no longer be left to the somewhat barbarous stock exchange-cum-public flotation methods that now obtain and that are so frequently a source of loss to those who can ill afford it.

The Beet Sugar Subsidy

THE British beet sugar industry, which has kept nearly 400,000 acres under the plough and enabled the factories to pay out to the farmers £8,000,000 a year for their crops, has received with satisfaction the announcement that the Government has decided to continue to assist the industry without any specific limitation of the period of assistance. Three months ago the Greene Committee, consisting of three members, presented a report in which two members recommended the termination of the subsidy and one advocated its continuance, and it was stated that if the majority report had been adopted the industry would have shrivelled away and 40,000 labourers would have been thrown out of good employment. The Government proposes to limit directly-assisted production to the equivalent of 560,000 tons of white sugar, and to carry out its new policy it proposes to set up an independent Sugar Commission to supervise the working of the existing factories. The rates of assistance will from April, 1936, be determined by the Government on information supplied by the Commission, and from the end of the period assistance will be given at a basic rate subject to review every three years.

Agreement has been reached between the factories and the refineries. Under the arrangement the beet sugar factories will not for five years exceed a production of 500,000 tons of white sugar, and the refineries will purchase at a fixed price all quota rights offered by the factories up to 220,000 tons. The scheme has secured the good-will of both sections of the sugar industry. Mr. A. Palache, chairman of the Beet Sugar Factories Committee, states that the proposals are welcomed as a definite settlement of policy, under which the future of the home-grown section of the sugar industry, with its great agricultural interest, is secured. One of the principal merits of the proposed new arrangement would seem to be that it starts off with the good-will of both sections of the United Kingdom sugar industry.

Amalgamation of Factories

IN connection with the new beet sugar subsidy proposals it has been decided to adopt the recommendation of the Greene Committee that the beet sugar factory companies should be amalgamated in a single corporation. The Beet Sugar Factories Committee, representing all the beet sugar companies, has informed the Government that it is prepared to recommend in principle to the boards of the respective companies that an amalgamation scheme should be prepared and submitted as soon as possible to the Sugar Commission, and, if approved by them, to the Government. The Factories Committee is of opinion that if the amalgamated corporation is to be formed, it should become operative before April 1, 1936. In order to facilitate procedure, the Government proposes to set up an informal tribunal to advise them upon any scheme of amalgamation which the factories may submit for approval. The financial arrangements which the Government proposes are based on the assumption that, as from April 1, 1936, there will be a transitional period of not more than five years. During this period, assistance will be given upon a diminishing scale, based upon certain standard levels for the world price of sugar, the price of beet and other factors, and liable to variation from those standards. Subsequently the basic rate of assistance will be subject to review at triennial intervals.

The basic rate of assistance for the industry for 1936, adjusted for the price of beet, will be reduced to 5s. 3d. per cwt. of white sugar (compared with 6s. 6d. this year). The price to be paid for sugar-beet sown in 1936 is to be 35s. and 36s. per ton respectively, delivered to factories that are paying 36s. and 38s. per ton under current contracts. The best price in 1937 and subsequent years, and the terms and conditions of the contract, will be matters for negotiation between the amalgamated corporation and the growers, and in the event of failure to agree will be referred to the Sugar Commission.

Power Alcohol Development in Europe

By Dr. N. G. Chatterji
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THE problem of using alcohol as a source of energy has been engaging the attention of the scientific world from a long time. Whatever may have been the reasons for prompting the undertaking of this problem in the pre-war days, there is no doubt that at the time of the war, and immediately after, certain aspects of the problem were brought out in strong relief and led every country to push on energetically with the task of solving it to its own best advantage.

Though each country has some special reasons for its interests in power alcohol, a careful examination of the history and growth of this industry in the more important countries of Europe reveals several reasons common to all of them: (i) To minimise the heavy drainage of national wealth out of the country on account of imported petrol; (ii) the advisability of having a national product as a substitute for petrol, in view of the sad experience due to shortage of petrol in the country during the war; (iii) to obtain freedom from the indirect tyranny of the powerful petrol groups, which have very often influenced the politics of the country; (iv) the necessity of having a large supply of alcohol which is now regarded as an important munition; (v) to have a potential motor fuel available within the country—an important consideration due to the rapid mechanisation of the army; (vi) the alcohol industry can be made to play a very important part in the prosperity of an agricultural country; (vii) the heavy drop in the consumption of alcohol for drinking purposes.

The Motor Car Industry

The development of the automobile industry concentrated the problem of power alcohol more or less in one definite channel, namely, the use of alcohol for driving motor cars, the success, if achieved, in this matter offering an almost limitless market for alcohol. But even during the early stages of experimentation on the running of automobiles with alcohol it was realised that motor car engines designed and constructed for working with petrol cannot be run satisfactorily on alcohol alone. Trials with mixtures of hydrocarbons and alcohol, however, gave encouraging and favourable results, and extensive experiments under strict scientific control were undertaken under State patronage in France, Germany, Sweden, Czechoslovakia and Poland. The unanimous result of these experiments was the knowledge that a mixture of hydrocarbons and alcohol in certain proportions can replace, without the least disadvantage or trouble, pure petrol for automobile driving. Once this fact was firmly established, research work was directed to find out the most suitable composition of the "carburant mixture."

Mixture Experiments

It is hardly necessary to mention that every country tried to produce mixtures containing a high proportion of alcohol and replacing imported petrol by indigenous hydrocarbon liquids like benzol. Bench experiment carried out with alcohol-hydrocarbon mixtures having given very favourable results, vigorous efforts were made to push such mixtures in the market under State patronage and help. But a tremendous setback in the development of the use of such mixtures came in a difficulty in practice, the gravity of which could not be fully realised in the experimental stages. The difficulty was the tendency for such mixtures to separate into their components, specially at low temperatures during winter. The tendency to separate becomes less as the proportion of alcohol is increased and also by the addition to petrol of aromatic hydrocarbons like benzol. It is eliminated for all practical purposes if absolute alcohol be used in place of rectified spirit, because the miscibility of absolute alcohol and petrol is very high even at low temperatures. This property of absolute alcohol was well known, but absolute alcohol was, till recently, almost a chemical curiosity, and therefore most of the researchers had busied themselves in compounding stable mixtures with rectified spirit. Fortunately, however, the forevision, optimism and perseverence of some chemists in France, backed financially by capitalists of broad outlook, directed them towards solving the problem of industrial manufacture of absolute alcohol.

It was in 1922 in Beziers, France, that the world saw the first appearance of as much as 200 hectolitres of anhydrous alcohol prepared by Loriette by the classical lime method considerably improved by him. But the problem was really solved when the chemist Guinot, of the Distilleries Deux Sêveres, France, succeeded in the industrial application of the purely theoretical principles of azeotropic distillation and preparation of absolute alcohol—demonstrated long ago, in 1902, by Professor Young, of Dublin—a process which he had particularly mentioned as of theoretical importance only. The principles of the azeotropic process of making absolute alcohol are so intensely "theoretical" that it has always been severely laid aside by everybody as "out of the question." But, as has happened in many cases, the genius of an individual succeeded in giving the proper orientation from theory to practice.

Compulsory Mixing Laws

With the industrial success in the manufacture of absolute alcohol the problem of "motor spirit" became considerably simpler. Not only all the technical difficulties vanished with the use of absolute alcohol-petrol mixtures, but certain distinct advantages were brought out. Henceforward most of the work in the matter of "power alcohol" was directed to finding out ways and means by suitable legislative, economic and financial measures to bring down the price of alcohol to the same level as that of petrol—a task that has been occupying the best brains of every country. In spite of vigorous efforts made by States to encourage the use of "carburant alcohol," success was achieved only when legislative measures were passed compelling petrol companies to buy a certain quantity of country-produced alcohol for mixing with petrol. Such compulsory mixing laws are now in force in France, Germany, Hungary, Czechoslovakia, Jugoslavia, Italy and a number of smaller States.

The history of the development of power alcohol in France is intimately connected with the rivalry between the industrial distillers of the North and the wine producers of the Midi. The extensive wine industry in France firmly established in the Midi and the South has always been jealous of the expansion of the spirit industry in the North, and kept on a fight in order to preserve the realm of potable spirit from being encroached upon by the distillers. The trouble became still more acute when, after the war, active help was given by the State to re-establish and expand beet cultivation in the devastated areas of the North. This was soon followed by an over-production of beet and the world crisis in the sugar market. The only alternative to save the beet agriculturist was to direct his produce to distilleries and to find an increased outlet for alcohol in industries. Thus it is that the famous Congress of "Carburant National" of Beziers was organised in April, 1922, by the Agricultural Society of Beziers. This congress had for its object "the finding of a better formula for the utilisation of alcohol as carburant and assuring in this way in the country an arm for national defence, a better balance of account, and a stable base for the development of agricultural prosperity."

Enforcing the Use of Alcohol

In the meantime, the scientific committee of the Commission of Carburant National, created on November 5, 1918, had also started with the work of physico-chemical investigations of alcohol-hydrocarbon mixtures and the behaviour of the latter in internal combustion engines, and finally made certain recommendations to the Minister of Finance. On the results of these recommendations, the Law of February 28, 1923, was passed. This was the first legislative measure adopted in any country to enforce the use of alcohol as a carburant for "force motorice." This law did not enforce the use of absolute alcohol, but it imposed on all importers of petrol the obligation to acquire every month from the State Alcohol Service Department a quantity of alcohol proportional to the quantity of petrol cleared by them from the Customs during the preceding month, such alcohol being

obligatory to be used only for driving automobiles. The maximum percentage of alcohol to be taken by the petrol importers in this way was fixed at ten, but in practice this limit has never been reached, for various reasons.

It is necessary at this stage to mention that in France the entire production of industrial alcohol—from beet, molasses, grain and sources other than vine and fruits—is reserved to the State, which used to purchase the entire production and sell it to the various industries at prices so cleverly adjusted that no undue hardship is entailed on any individual industry, while the Service is able to defray its expenses out of its transactions. Now power alcohol has to be sold to the petrol importers at a price such that the petrol-alcohol mixture may be marketed at substantially the same price as duty-paid petrol. It is therefore evident that the sale of power alcohol, done at considerable loss, must be strictly regulated by the sales in the more profitable branches and by the average purchase price of alcohol.

Rapid Increase in Production

Up to 1929 the Service had been able to dispose of the whole of the industrial alcohol produced in the country without incurring any net loss. But the recent slump in the sugar market diverted large quantities of beet from the sugar factory to the distillery; for the distillers had not only a guaranteed purchaser in the State, but the price paid for alcohol was also on a parity with the price of sugar. The result has been a rapid increase in the production of industrial alcohol within the last few years. Legislative measures were therefore passed in March, 1933, limiting the maximum quantity of industrial alcohol to be acquired by the State, and making it compulsory for the petrol importers to market "essence poids lourds" only in the form of an alcohol-petrol mixture, containing minimum 25 litres and maximum 35 litres of absolute alcohol per 100 litres of petrol. (Law of July 4, 1931.) Furthermore, this law envisaged the possibility of making it compulsory for all kinds of petrol—that is, "essence tourism" also—to be marketed only in the form of a mixture with alcohol, in case it is found that the quantity of "essence poids lourds" imported is not sufficient to consume the whole of the alcohol available for "carburation."

To reduce the cost of the mixture to the consumer and lessen its disparity with the price of petrol, two measures have been taken by the State. First, exemptions from inland duty are granted for a portion of the petrol or benzol used in the mixture. Secondly, a special surtax is levied on imported petrol, the proceeds of which are appropriated by the State Alcohol Service and offset against the cost of power alcohol. The present total consumption of alcohol for power purposes in France is in the neighbourhood of one million hectolitres per year.

Potato as Raw Material

In Germany the agricultural distilleries working with potato as raw material play an important rôle in the national welfare of the country, and the prosperity of the agriculturist depends a good deal on a profitable outlet for this alcohol. Moreover, during the war the demand for alcohol was such that large plants had to be installed for the production of alcohol from sulphite waste liquor. At the same time, there has been considerable diminution in the consumption of potable spirit in the country. All these brought about a crisis in the alcohol industry and led to tremendous efforts for utilising it as a carburant. During the early periods, attempts were mainly directed towards the preparation of ternary mixtures stabilised at low temperatures by the incorporation of benzol, and, though strong efforts were made to push these products—known as Monopoline—in the market, they did not seem to have met with much success. In the meantime the manufacture of absolute alcohol became a commercial success, and the experiments of Professor Wawziniok, of Dresden, undertaken at the request of the Reichsmonopolverwaltung, demonstrated the superiority of an absolute alcohol-petrol carburant of definite proportions over pure petrol. It was very satisfactorily demonstrated that such a mixture can also be advantageously used in ordinary carburettor-fed engines of motor cars.

This led the Government to pass the decree of July 4, 1930, by which an outlet for alcohol was assured, thus giving a strong impetus to the development of power alcohol in the country. In order to bring in the provisions of the decree gradually and to avoid unnecessary and costly severities the prescribed percentage to be taken by the petrol importers or makers was slowly raised. Thus, from August 1, 1930, to March 31, 1931, it was 2½ per cent., and from then until September 30, 1931, it was 3½ per cent. A further increase to 6 per cent. was fixed for the period October 1, 1931, to September 30, 1932. When it was seen that the power alcohol could be marketed without difficulty, and, further, that the consumer had forgotten his prejudice against it (and also because it was demanded by the potato growers), the prescribed quota was increased to 10 per cent. from October 1, 1932.

The smaller part of the power alcohol thus taken by the petrol companies (as prescribed in the decree) is mixed in the proportion of 20-30 per cent. by weight of alcohol, and 70-80 per cent. by weight of petrol and/or benzol. The other, and by far the greater, part is put on the market as a 10-15 per cent. by weight mixture with petrol and/or benzol and sold as an anti-knock fuel.

At present, under the Reichsmonopolverwaltung, some ten power alcohol plants are working in Germany, the sale of industrial alcohol being a State monopoly. The present consumption of power alcohol in the country is about two million hectolitres.

High Tariff Walls

The Republic of Czechoslovakia, created after the war from the former Austrian Empire, had to tackle soon after its birth the problem of the production of alcohol which was concentrated in this part of the Empire. The neighbouring States all raised high tariff walls against foreign spirit, so that the alcohol industry of the Republic fell down almost to the point of collapse. The gravity of the situation can be realised when it is noted that about three-fourths of the production of alcohol is from potato in the small agricultural distilleries. This is why as early as 1920 vigorous steps were taken to bring alcohol into use as a carburant. The "Spiritusverwertungsgeschellschaft," the central organisation controlling the production and sale of alcohol in the country, set up an experimental station at Prague for the investigation of alcohol-hydrocarbon carburants and placed some of these on the market under the name of "Dynalkol." In accordance with the experience gained in the experimental station the formula of Dynalkol was changed from time to time. The last formula which was in use before the introduction of absolute alcohol was practically the same as that of the German "Monopoline," namely, 50 parts of rectified spirit of 96 per cent. strength, 30 parts of petrol, and 20 parts of benzol.

Fear of Petrol Price Increase

In spite of the best efforts of the authorities the use of Dynalkol could not be pushed amongst the public, and its use remained confined almost wholly in the State services. It became apparent that legislative measures alone could give the necessary stimulus to the use of carburant alcohol. In the meantime the superior qualities of absolute alcohol-petrol mixtures had been clearly demonstrated, so that the Government was induced to pass the law of June 7, 1932, brought into force from September 1, 1932. The main objection to the introduction of the compulsory mixing law was that it would increase the price of motor fuel, resulting not only in an increased burden on the motoring public but might unfavourably affect the motor building trade. But these disadvantages were outweighed by the benefits likely to follow from the obligatory mixing law, which was passed without any serious opposition.

The Law of June 7, 1932, made it obligatory for all mineral oils, whether produced in the territory of the Republic or imported from abroad, of which the specific gravity is less than 0.790 at 15° C., and which are destined to be used as motor fuel, to be mixed with alcohol in the proportion of 80 parts of petrol to 20 parts of alcohol, before they can be brought into free circulation. As a result of this law the consumption of power alcohol in the country during the following year was about 586,000 hectolitres, being almost one half of the total consumption of industrial alcohol.

It is not possible in this brief survey to trace further the growth of the power alcohol industry in Europe, but it must be acknowledged that a number of other countries, chiefly Sweden and Poland, have played an important part in the development of this industry which is being actively encouraged by almost every government.

Fume Emission Troubles in Scotland

Annual Report of the Chief Inspector of Alkali Works

ACCORDING to the Annual Report on Alkali, etc., Works for the year 1934 (H.M. Stationery Office, 9d. net), the number of works in Scotland registered under the Alkali, etc. Works Regulation Act, 1906, during 1934, was 97. Registered works decreased by 4 as compared with 1933 and no new works were added to the register. The works which discontinued registration were one each for the manufacture of carbon bisuphide, sulphate of ammonia, nitrate and chloride of iron, and bisulphite; of these works three had not been in operation for some considerable time, whilst the fourth worked only spasmodically and on a small production.

The number of scheduled processes (172) shows a net decrease of 5—actually 7 processes were removed from the register—whilst 2 new ones were added. It is significant that the sulphate of ammonia figure showed a decrease of only 2; during 1932, 20 plants for this process did not take out registration, whilst in 1933 the number was 11. Scheduled processes in operation included 4 alkali (saltcake); 1 alkali (wet copper); 1 smelting; 11 chemical manure; 4 nitric acid; 11 sulphuric acid; 8 sulphuric acid, Class II; 7 bisulphite; 7 lead deposit; 8 sulphide; 37 sulphate of ammonia; 3 muriate of ammonia; 15 gas liquor; 43 tar; 1 arsenic; 2 nitrate of iron; 1 picric acid; 3 chlorine; 2 muriatic acid; 1 paraffin oil; 2 zinc extraction.

Oil Works in Stirlingshire

With regard to an oil works in Stirlingshire, the chief inspector regrets to report that conditions have deteriorated and that the incidence of objectionable smells in the last two months of 1934 was much greater than it has been for some considerable time. This, however, was unavoidable owing to a change in the crude oil supply which was made in November. The different type of oil has resulted in the creation of many new technical difficulties, and also in the production of a greater quantity of gas during distillation. The gas has a higher sulphur content than before and is of a more objectionable nature. The technical staff of the works are endeavouring to overcome the difficulties with which they are faced. In addition, deodorisation experiments are being carried out in a semi-technical scale.

Another complaint against oil works has been made during the year. The factory, which is situated in Ayrshire, manufactures a bitumen from imported crude oil and somewhat bitter complaints were made against the plant. The matter was investigated and it was decided that the nuisance was caused by oil gas produced during distillation and liberated at the tail box of the plant. A suggestion was made to the firm that an experimental deodorising plant using hypochlorite should be erected to deal with this gas. This was acted upon and an immediate amelioration of the conditions resulted.

The firm has now decided to install a permanent automatically operated plant, and there is no doubt that when this is in operation the nuisance will be largely eliminated.

Viscose Factory Emissions

Some progress has been made during the year towards the elimination of offensive odours emitted by the viscose factory in Roxburghshire. Chlorination has now been in operation for some considerable time and has proved satisfactory. During the year, however, considerable structural and plant alterations have taken place within the factory, and increased production has resulted in the chlorine administration plant being worked to its full capacity. A second plant, however, has been obtained, and it is intended during the alterations at present in hand to connect all points, not previously draughted, to the main exhaust system. This will definitely eliminate low level escape, and it is hoped that early in 1935 gases from all parts of the plant will be subject to deodorisation.

In the heavy chemical industries, acid production has exceeded the 1933 level by some 20 per cent. and there has been an increase of 10 per cent. in the amount of sulphate of ammonia manufactured. Reference was made last year to the tendency for sulphate of ammonia to be produced in large works where acid was also made or where it could be obtained at a favourable price. This rationalisation process has extended during the past year and several new plants have been installed for the concentration of weak ammoniacal liquor for transport to central works where it can be fixed in bulk.

The amount of salt decomposed in alkali works has increased by over 33 per cent. as compared with 1933. The average amount of hydrochloric acid discharged to the atmosphere in the residual gases from chimneys and other final outlets was 0.045 grains per cubic foot, whilst the average acidity was 0.31 grains calculated as sulphur trioxide.

The annual returns of the amount of pyrites and spent oxide burned for sulphuric acid shows that the acid production in Scotland during 1934 was some 20 per cent. more than that manufactured in 1933.

The escape of acid gases from chamber process outlets has been, in general, maintained at a satisfactory figure, but on two occasions it was found that the statutory limit was exceeded. In both cases the infringement was only temporary and was caused by the smooth working of the plant being upset by causes beyond the control of the owners. The average escape from chamber plant was 0.81 grains of acidity per cubic foot of exit gases, expressed as sulphur trioxide, whilst in concentration plants (Class 11) the average escape was 0.30 grains. Contact process manufacture has been carried out satisfactorily and the average escape for the year was 2.41 grains per cubic foot of residual gases.

A Complaint at Glasgow

A complaint was made early in the year against a large sulphuric acid works in a thickly populated district of Glasgow. Within the factory are several chamber plants and also concentrating plants. The processes have always been operated satisfactorily and the plant maintained in an excellent state of repair, whilst for many years the legal limit has not been exceeded. It is unfortunate, however, that the works are situated in close proximity to business premises and dwelling houses, and occasionally acid fumes can be observed in the vicinity of the factory and this from time to time has led to complaint. Obviously no official action under Alkali Act was possible, but the owners of the plant have agreed to take all possible steps to minimise the escape of acid fumes.

During the summer an accident occurred in a sulphuric acid plant in West Lothian whereby a large amount of sulphur dioxide was liberated to the atmosphere. A rent developed in the lead-work of one of the chambers and a considerable escape of gas took place before repairs could be effected.

In the manufacture of fertilisers, production has increased by about 12 per cent. as compared with the 1933 figure, but was still some 5 per cent. below the figure for 1932. The removal of acid gases by the various wash towers has been very good, the average condensation being 99.3 per cent., whilst the average acidity of the residual gases after scrubbing was 0.038 grains per cubic foot expressed as sulphur trioxide.

Large Scale Experiments

Two complaints were made during the year against a factory in Glasgow. The first was of dust and fumes emitted by a rotary dryer, and the trouble was overcome by installing an additional dust catcher. In the second complaint, it was alleged that objectionable fumes were being emitted from the final outlet of the scrubbing tower connected with the superphosphate plant. The matter was investigated and it was found that a disagreeable odour was undoubtedly present and the cause of this was assigned by the management of the firm to an abnormal organic content of a particular consignment of phosphate rock. The scrubbing tower itself—which had been recently built—was certainly operating with entire satisfaction, and only a trace of acid was discernible at the final outlet. Experiments showed that the objectionable constituent was insoluble in water and unaffected by alkali. It was apparently of organic nature and was completely destroyed by a dilute solution of hypochlorite. The firm agreed to carry out large scale experiments with a view to deodorising the tail gases from the plant.

As compared with the previous year, ammonia production has shown an increase of some 10 per cent., but the greatest

increase was that in material manufactured in coking plants, and here the increase was over 50 per cent. The production from shale is almost the same as for the previous year, and this figure has remained almost constant for some years past. The process of rationalisation of ammonium sulphate manufacture has extended during the year and several new gas liquor concentrating plants have been installed.

The total increase in tar distillation during 1934, as compared with the previous year, is only some 3 per cent., but the major increase has taken place in coking plants, and slightly more than one and a half times the amount of coke oven tar has been distilled. During the year no serious complaints have been received against tar works and plant has generally been efficiently maintained and supervised.

Fluorescent Analysis of Fuel Oils and Lubricants

By J. A. RADLEY

AMONG the new methods of testing oils and lubricants that of observing the fluorescence in filtered ultra-violet light is of considerable value. For some years certain dyers and bleachers in the trade have made use of the intense fluorescence shown by mineral oils in general to detect soilage of material by this class of substance. Long before a cheap and efficient source of ultra-violet light was available in the laboratory, chemists used the characteristic fluorescence of mineral and resin oils for their detection; dipping a glass rod in the oil or pouring a drop down the side of a test tube, and examining it in bright daylight against a dark background, gave a rough guide. With the advent of the quartz mercury vapour lamp fitted with a filter for ultra-violet light, the test becomes more certain and more widely applicable.

It should be noted, however, that the test is only indicative and should be taken in conjunction with other tests before giving an opinion on the identity of an oil, *e.g.,* mineral oils in general show brilliant fluorescent colours, but it is possible by special processing or by the addition of nitro-naphthalene, or other "deactivators" to weaken the characteristic fluorescence very greatly.

Pure paraffin oil shows no fluorescence, but if contaminated with petroleum spirit or with petroleum jelly, even to the extent of 5 per cent., a bright blue fluorescence is developed. The amount of petroleum present can be gauged from the intensity of the fluorescence and the depth of the luminous zone below the meniscus of the liquid. The more petroleum there is present, the less the depth of the zone and the more intense is the fluorescence. Light oils containing benzene give a yellowish fluorescence, but as the benzene is removed the colour tone changes, and progressively weakens until it finally disappears. A. Bentz has found that crude oils of German origin can be rapidly differentiated from the refined oils by use of ultra-violet light.

An Easy and Rapid Method

The method is very easy and rapid to carry out, and apart from a source of ultra-violet light it requires little in the nature of apparatus unless elaborate research work is to be undertaken. For examination, 10 c.cs. of oil is placed in a tube of quartz or Kavalier glass, the intensity and colour of the fluorescence in the body of the liquid and at the meniscus being noted. A drop of the oil is then allowed to run down a sheet of non-fluorescent glass which has been backed with black paper, the intensity and colour of the streak and the drop being noted, or, as some workers prefer, the oil drop is enclosed between two microscope slides of non-fluorescent glass, and the fluorescence examined, noting the direct and the transmitted light. Finally, a drop of the oil is put on to filter paper and examined under the lamp.

J. Muir has used the last method as a preliminary test in his examination of mineral oils, as it is very rapidly carried out. He advocates also the use of solutions of the oil in a non-fluorescent solvent such as carbon disulphide or chloroform as a means of extending the qualitative value of the test. In this case the fluorescence of the solution is influenced by the concentration of the solute and by certain physical constants of the solvent.

The German Customs officials use the fluorescence test for the examination of benzol entering the country. Benzol enters Germany duty free, but tax is payable on petrol. The first mentioned commodity is inert under the lamp, but should it show a bluish fluorescence the test is taken as indicative of the presence of petrol as only small quantities of this are required to produce the blue fluorescence.

It is interesting to note that the use of the lamp for examining the non-gumming properties of lubricating oils has received some attention. M. Freund has elaborated a test whereby the oil is exposed at a standard distance to the light of a mercury arc for 10 minutes. He claims that the results for the potential gum content is in close agreement with the figures obtained by storage tests, and that the carbon-hydrogen ratios of the gums produced by both methods are similar. J. Muir has worked on this problem from a different angle. A good oil will withstand a long exposure to the atmosphere in the form of a thin film and, examined under the lamp at the end of this period, will be found to possess its original fluorescence. On the other hand, a poor oil which develops gum in use will not withstand this treatment and its fluorescence will change from a greenish tone to a yellowish colour very soon after exposure. This test by Muir is definitely of value, as by means of the fluorescence the present author was able to arrange correctly in the order of tendency to gum, a number of oils which had been previously tested for gumming properties and was able to predict the gumming tendencies of a further batch which were subsequently examined.

A colour change in the oils themselves often takes place on exposure to the lamp, and some years ago Hirst suggested this as a means of differentiating oil spots on textile materials and elaborated a test on this basis.

Vegetable Oils for Lubrication

The use of oil-soluble soaps in the preparation of lubricating greases offers some scope for research using the lamp, but so far no papers have appeared on this subject. The suggested use of vegetable oils for lubricating purposes in internal combustion engines brings us to a short consideration of these oils, one of which is olive oil. Olive oil is prepared by solvent extraction and has a blue or violet colour under the lamp although a virgin olive oil shows a yellowish fluorescence. Most of the work done on this oil has been from the point of view of detecting and estimating refined oil in admixture with virgin oil so that further discussion need not be entered into here.

A new method holds several possibilities for its use in the oil industry which remain to be fully investigated. For example, Wittich has examined the distillation products from Manchurian and other oil shales. The fluorescence colours shown by these products gave useful indications regarding their origin and the processing and cleaning could be followed. After a little practice this worker claims that the various fractions obtained by distillation can be accurately graded according to their boiling points by the observation of their fluorescence.

Other tests which can be carried out with ultra-violet light is the determination of the stability to light of dyestuffs added to petrol which contains certain additions, such as lead tetraethyl, and the checking of deliveries of transformer oils against samples submitted and standards.

IN 1934 the Government of Turkey definitely decided upon the creation of a national chemical industry for the production of a limited number of leading basic chemicals required by the country's leading consuming industries. The chemical project in the Industrial Five Year Plan adopted that year aims at the establishment of plants for the production of sulphuric acid, chlorine, caustic soda and superphosphates. The contemplated sulphuric acid plant is expected to supply about 2,500 metric tons annually. According to present forecasts other plants will be expected to produce about 2,500 tons of caustic soda and 2,000 tons of chlorine each year.

Fig. 1. A Nordac Lined Hydrochloric Acid Road Wagon Tank lined on site.

Storage and Transport of Chemicals

Improvements in Handling Corrosive Liquids in Bulk

THE bulk transport of corrosive liquids, such as hydrochloric, sulphuric and nitric acids, has almost revolutionised the chemical industry. Formerly such substances were manufactured on site for immediate use, although the glass carboy was used for the carriage of small quantities required for occasional use by the smaller firms. Industries such as artificial manures, explosives, and pickling of iron and steel sheets for the galvanising and tinplate trades, generally erected plants themselves for the manufacture of these acids. Sulphuric and nitric acids can be made in a state of high concentration when their attack on iron and steel vessels is negligible. Hydrochloric acid, however, rapidly attacks iron, steel and most metals as 30 per cent. strength, at which it is usually made and used. For this acid some means of protecting the ironwork is necessary.

Formerly tanks for hydrochloric acid were constructed of stone, slate, earthenware and brick set in special cements, and steel and cast iron lined with ebonite, but there was a limit to the size of vessels so constructed. Since the war there has been a large increase in the scale of operations necessitating much larger tanks than could be constructed as just mentioned. This difficulty has now been overcome by the use of specially compounded rubbers which can be applied on the site and make possible the lining of tanks of any size or shape. Nordac, Ltd., claim to be the pioneers of this type of chemical engineering and have constructed many large tanks for the pickling, electroplating, food, brewery, laundry, and general chemical industries, which has enabled steel tanks to be lined in the works of the steel tank maker or after the tank has been erected in position on site.

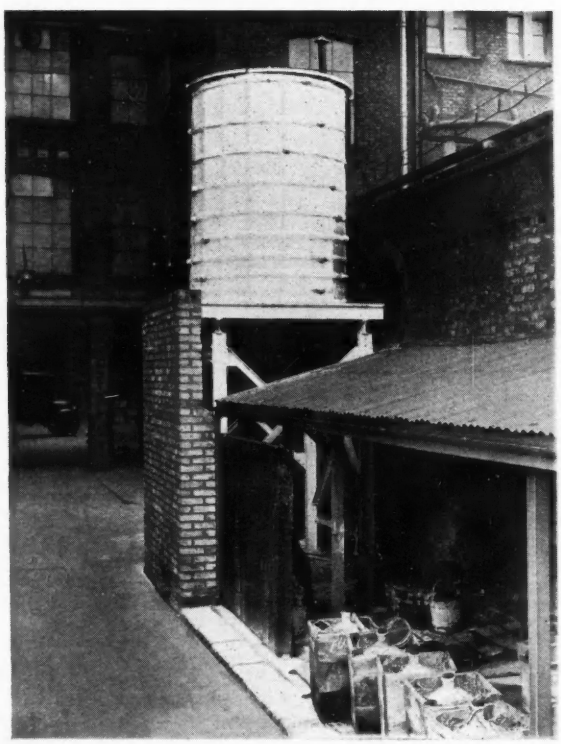


Fig. 2. Nordac Patent Rubber Concrete Storage Tank erected in a confined space in a London lamp factory.

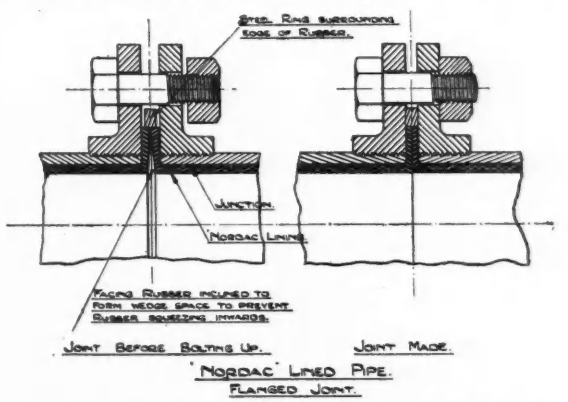


Fig. 3. Nordac Flanged Joint for Rubber Lined Pipes.

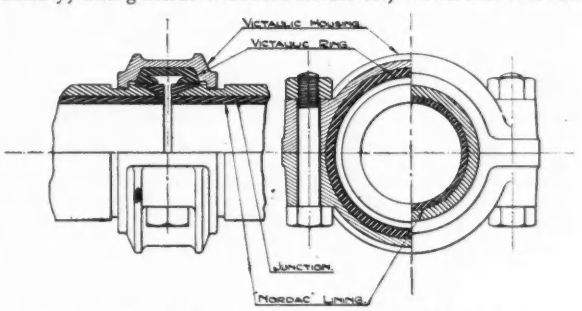


Fig. 4. Victaulic Joint for Nordac Lined Pipes.

Fig. 1 shows a steel road wagon tank for the transport of hydrochloric acid which was lined in the open in the

works of the tank maker. It is fitted with manhole with a perforated rubber bag to prevent the entry of adventitious material when the lid is removed, and a safety plug valve in addition to the outlet valve for bottom discharge, or,

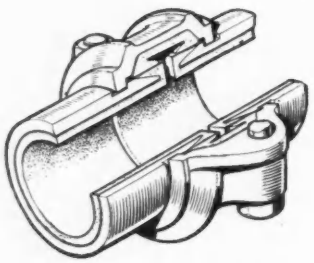


Fig. 4a. Victaulic Joint.

alternatively, a pipe discharge for blowing out the acid by compressed air.

Storage tanks are usually wood vats or steel tanks lined with rubber, or, better still, Nordac patent rubber concrete lined with the same soft rubber. The rubber concrete tanks, though a little more expensive, possess the advantage of being slightly flexible and almost free from attack of fumes on the outside. They are constructed like a wood vat on site and thus can be placed in confined positions. Moreover, little maintenance charges are incurred. In lieu of a guarantee, this firm offer a service arrangement whereby for a small annual charge the tank is kept in repair. Fig. 2 shows a Nordac patent rubber concrete tank erected in a confined space in a London lamp factory.

The piping of acid round a works is usually a risky business, but Nordac rubber-lined cast iron or steel pipes with either flanged or Victaulic joints have proved satisfactory. Some of these pipe-lines have been in constant use for seven years (Figs. 3, 4 and 4a). A cheaper form of pipe-line is a well-made hose with an outer covering of acid-resisting rubber with a special hose coupling. The coupling of hose is usually done with flanges held together by iron rings and bolts or by a spigot of reinforced ebonite inserted in the end of the hose. An improved form of hose coupling is available in the form of an adaptation of the engineer's cone joint, but as all parts are made of vulcoferran (a tough ebonite) there is no ironwork to be corroded. This joint can be actually immersed in the acid bath; it is also free bore.

Aluminium Drums and Tanks

A FINE example of a well-designed container is the aluminium acetic acid drum manufactured by the Aluminium Plant and Vessel Co., Ltd. These drums, which are also used for conveying nitric acid, are made of pure aluminium, heavily reinforced by a mild steel framework of channels and rolling hoops. Aluminium is, of course, selected in this case both for resistance to corrosion and non-degradation of product, and the bungs and outlets are designed so that aluminium contact is continuous throughout. Before being passed for service these drums were thorougnly tested by the railway companies, and they are now looked upon as the standard container in this country for transporting acetic acid. The usual capacity is 96 gal., but they can also be supplied in 50-gal. size.

This company is doing a rapidly-developing business in aluminium transport tanks. The use of aluminium for tanker construction is not, of course, of recent introduction Aluminium beer and milk road tanks have been made by this pioneering concern for a considerable time, and their acetic acid rail tanks have been in service for many years. Use of this metal for road transport tanks dates from the imposition of heavy taxation on unladen weight, and the last few years has seen the introduction of aluminium road tankers for carrying vegetable oils, toluol, tar benzol, fuel oil, petroleum, etc. Some idea of the progress that has been made can be gauged from the fact that three years ago only two petrol companies used aluminium tankers, whereas now practically every well-known brand of motor spirit is carried in tankers made by the Aluminium Plant and Vessel Co. In addition to the saving in taxation, the light weight of aluminium tankers often makes possible the use of a lighter and cheaper chassis, with lower running costs, or, alternatively, the saving of weight can be utilised by increasing the pay-load capacity on a given chassis.

Aluminium Road Tank Wagon, capacity 320 gal., for the transport of Toluol. (Aluminium Plant and Vessel Co. Ltd.).

The Railway Container System

IN order to facilitate the co-ordination of transport services and to provide the most up-to-date methods for the movement of freights, the British railways have introduced what is known as the "container system." Under this system door-to-door or point-to-point transport is effected between the sender and consignee with the assistance of mobile truck bodies, which are interchangeable between rail or road vehicles and can be freely moved by either.

There are now in service no less than 10,636 containers on the British railways, whereas in 1928 there were only 1,574. As indicating the rapid rise to popularity which this transport system has achieved, the number of container movements in 1934 show an increase of 146 per cent. over those in 1930 and 700 per cent. over the movements in 1928. New overhead cranes have been installed at several of the principal London railway depôts to speed up the handling of container traffics. The siding accommodation under the cranes permits of the positioning of 120-130 container loads, the delivery of which can be effected without any shunting movement.

The advantages which have been proved beyond all doubt as resulting from the introduction of this new mobile system of transport handling are a reduction in packing costs, labour and materials, minimised risk of breakage and pilferage, the elimination of returned empties, and the reliability of delivery. Goods loaded into a container are not touched until they are delivered to the consignee. Containers operate on terms of equality with commercial motor vehicles, and being separate units from the chassis can travel both by rail and road. In the case of covered containers, the doors may be padlocked and the keys posted to destination, if desired.

In order to meet the requirements and suggestions of traders, a number of varying types of containers have been evolved. The most popular is the "B" type of covered container; this is approximately 14 ft. long, 6 ft. 6 in. wide, and 6 ft. 8 in. high and has a capacity of 4 tons. "A" type containers are covered, of 2½ tons capacity. A slightly larger container, the "C" type, can carry 3 tons and is used for the rapid transport of such goods as glass bottles.

An unusual type of container, "A.X.", specially constructed for the carriage of solid carbon dioxide, is insulated by cork to a thickness of ten inches. The loading or unloading is performed through a hatch-way fitted in the roof.

A Drum with Many Good Features

THE container helps the sale of the contents and the efficiency of the container reflects the efficiency, or at least the point of view, of the people who are sending out the product.

In the old days it was quite the usual thing to see a drum with the top covered with a collection of waste matter, oil

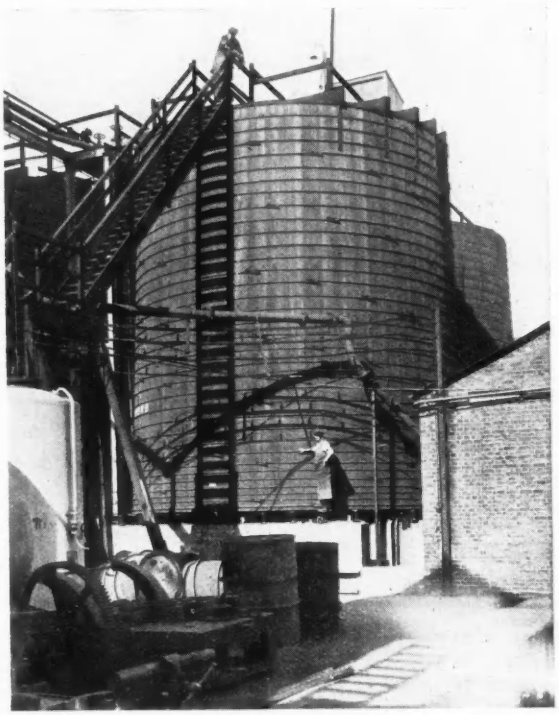
or disinfectant or whatever the contents might be, mixing with the dirt in the atmosphere. This material was all round the top, round the neck, and invariably down the sides, giving an atmosphere of dirt, inefficiency and colossal waste. Whoever used the container first of all had to wipe the waste material away, or risk it mixing with the contents, and because this was so manifestly inefficient the K.C.C. drum was invented.

This drum, supplied by E. A. Brough and Co., Ltd., is really a development of the patent bevel-edged drum which was invented to give the trade a container, the seam of which could not possibly be opened, and by bevelling the ends the makers could guarantee that a customer could use a one-pound hammer vigorously round the whole of the edge without any possibility of the seam opening, while the drum could be dropped from a height, the bevel acting as a cushion and preventing the drum from bursting. The patent bevel-edged drum, however, had the disadvantage of necessitating the neck being some distance away from the edge, and when the makers cut away the bevel by the neck and brought the neck to the edge of the drum they were able to claim that they had brought a drum as near to perfection as ever a drum will be. By simply holding a receptacle against the bead of the neck and tilting the package the contents can be extracted without any possibility of dirt from the top, or any foreign matter spoiling the oil or paint, and the drum can be emptied to the very last drop without effort or waste.

Despite the efficiency of this package, it is being produced in such large quantities (over a quarter of a million have already been sold), that E. A. Brough and Co., Ltd., are able to offer the trade this improved drum at only a very small addition over the price of the ordinary drum.

Wooden Vats and Tanks

FOR the construction of vats and tanks the basic property of wood is its *natural* resistance to chemicals, as contrasted with the artificial and expensive processes necessary to overcome



A 90 000 gal. Vat in British Columbian Pine, erected by Carty and Son, Ltd.

the inherent susceptibility of metals to attack by acids. Of course, the resistance of wood varies according to the kind of wood and the kind of acid concerned, and in any case the wood must be the best of its kind, thoroughly seasoned, and with all its natural defects strictly eliminated. On this foundation is built up the ever-increasing business which Carty and Son, Ltd., are doing in wooden vats and tanks for all trades in which chemicals are manufactured or used. Such trades are many and diverse: Art silk and adhesives, batteries and blacking, colours and candles, dyes and disinfectants, essences and explosives, films and furs—one could go through the whole alphabet. These, of course, are extra to the traditional uses of vats for brewers, distillers, wine, cider and vinegar makers.

Just one helpful hint about vats may be added. Vat making is a specialist job. The extra skill and experience of the firm that has been concentrating on vat making for generations just makes the difference in giving a vessel which will last and give no trouble. This specially applies to drastic processes in difficult conditions.

Carboys and Carboy Hampers

FOR nearly 60 years Leigh and Sons have been the leading makers of all-metal carboy hampers; they were also the inventors. The old-fashioned practice of employing wicker baskets died slowly in many places, but it is now almost obsolete for carboys of British manufacture. In constructing "Zulo" carboy hampers, the steel hoops are deeply grooved, thereby obtaining great strength. One of these hampers when inverted will support a hundred times its own weight without crushing. This may be demonstrated by inverting the hamper, weighing about 9 lb., and gently lowering a weighted cask of about 8 cwt., steadying same upon the hamper; under these conditions the hamper will sustain the weight without weakening. The makers of this carboy hamper also supply glass carboys, either packed in hampers or without hampers; safety crates for rail traffic, single carboys and small lots; carboy stoppers, fasteners and rubber caps. Various designs in emptiers are also available, as well as carboy barrows and trucks. Their latest carboy barrow is of an improved design to assist the maintenance of balance in wheeling. This barrow can be fitted, if desired, with a Dunlop wheel and pneumatic tyre, the tyre being inflated with a cycle pump.

Barrel Shaped Containers

GRAVE risks are run by using containers that have been designed without experience and which do not withstand the pressures generated by certain kinds of acids. In many instances these risks are taken without visualising the necessity for careful selection in the container designed for a special purpose. Goods are carried all over the world in ships, road vehicles or rail trucks, and the use of an unsuitable container might lead to the loss of a ship, lorry or even railway disaster with all the consequent results, not only involving the risk of human life, but heavy financial claims against the consignees.

Proper design, strength and ability to carry contents, with a finish which gives good advertising value, are the points to be watched in the purchase of containers. Strength lies in the use of suitable materials and in the design to which it is built. The ability to carry the contents without loss or danger is in the design, workmanship and knowledge of the using industry. Advertising value is in the appearance and the facilities provided for the customer to easily empty the contents.

Containers made by the Steel Barrel Co., Ltd., have behind them the accumulated experience of fifty years of manufacture for an infinite variety of uses, and the experience of many customers is that the cheapest is very rarely the best. The "barrel-shaped" package has considerable advantages in nine cases out of ten, over any other type. Because it is lighter, and of more convenient shape, it is far easier to handle than the ordinary cylindrical package with rolling hoops. One man can handle a barrel-shaped package as easily as two men can handle a cylindrical drum with rolling hoops of similar capacity; this has been proved over and over again in actual practice. In the second place, the rail transport charges are considerably less owing to the fact that a drum with rolling hoops made of the same thickness of steel as a barrel of similar capacity, weighs considerably more, simply owing to the weight of the rolling hoops. The strength of the drum or barrel depends on the thickness of metal in the body itself, and it is most important that the gauges of the metal should be compared, and not the weights. In the third place, the life of a well-made barrel is actually longer than that of the usual type of drum with rolling hoops, as sooner or later the latter are bound to either come off or get broken; even if these

are repaired, additional cost has to be incurred. No such troubles arise with the barrel-shaped package.

The most important point about a steel barrel is that it should not leak. The weakest part and the place where it is most likely to leak is the chimb. This is where it gets most hard knocks, and if there is the slightest weakness here there is sure to be trouble. In the "Uxbridge" steel barrels the makers have endeavoured to make the chimb the strongest point, and by using heavy inner and outer steel strip welded to the body and ends of the barrels in one homogeneous whole by the electric arc they have succeeded in their object, and it is a most rare occurrence for a barrel or drum made in the above manner to leak. Galvanising is done with one or both ends out, ensuring a perfectly clean package inside. Barrels and drums up to 90 gallons capacity can be coated, after manufacture, by hot-dipping with 99 per cent. pure tin.

An "Open-Top" Container for Liquids

OPEN-TOP air and liquid-tight metal containers of a patented M.L. pattern have been evolved by Reads, Ltd., to meet the necessity of a fully-open topped package with combined lever and hoop mechanism. There are no spanners or loose levers to contend with. The container can be used for liquids or powders and is suitable for home or export use. Closing is effected by a rubber, composition or other ring fixed inside the rim of cover and made air- and liguid-tight by the even pressure exerted by the lever hoop mechanism drawing the rim of body and cover with ring together, and thus positively making the whole one fixed unit. The action of closing is very simple, but remarkably effective, and requires no exceptional skill. The package can be sealed to prevent interference with contents in transit by passing a wire or other material through the holes provided in the levers. It is made in sizes from 10 in. to 22 in. diameter, with any depth up to 42 in., 24 B.W.G. metal being employed.

The C.S. pattern keg, also made by Reads, Ltd., is suitable for pastes, powders and similar products. It is provided with the usual knock-over pattern clips and has the additional protection of a sealing device—composed of two straps, punched at ends to receive sealing wires. A hole may also be punched into the handle. This method is simple, but very effective. No expert skill is required to fix. The straps are bent over as shown in the accompanying illustration and the sealing wire is threaded through the holes and then twisted. These kegs are made in all sizes and gauges from 6 to 22 in. diameter, and 4 to 40 in. deep.

M.L. PATTERN.

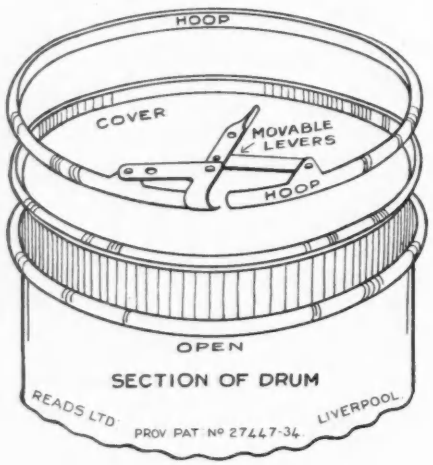


Fig. 1
Cover and hoop before fixing on to the package

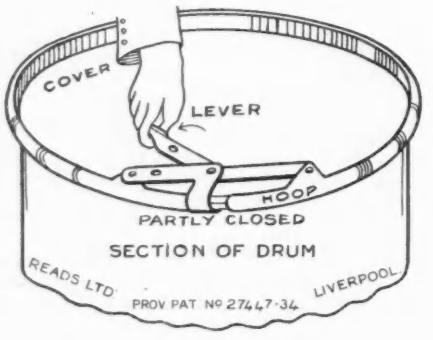


Fig. 2
Cover and hoop placed in position ready for final closing

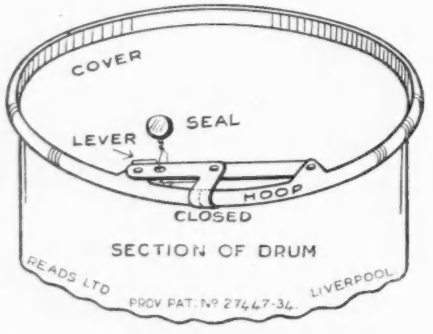
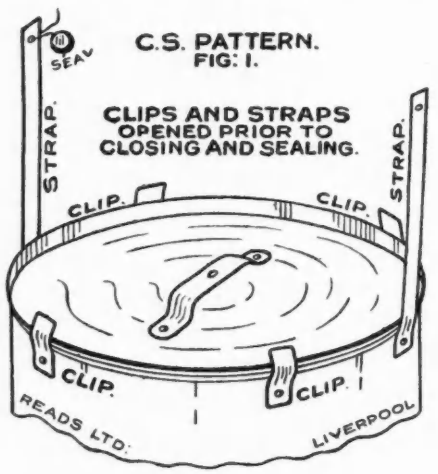
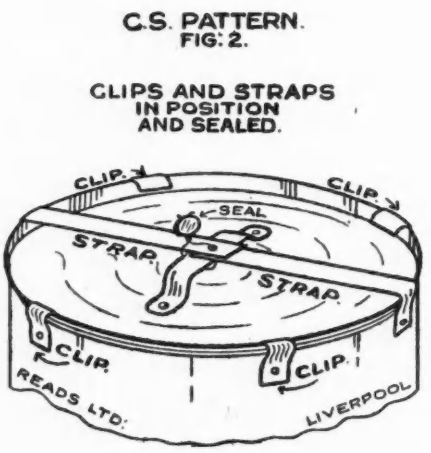


Fig 3
Package closed and sealed ready for transit





Advantages of Paper Sacks

SCIENTIFIC sacks for packing dry chemicals, fertilisers, glue and other perishable or contaminating products of the chemical trade are now being manufactured by Medway Paper Sacks, Ltd. These sacks are made entirely of specially treated paper. They combine hygenic and economical qualities by which they are superceding the customary casks and jute sacks with paper liners. Although these liners do

admittedly, protect the sack from being effected by the contents and also keep the chemicals in good condition, the modern practice of packing entirely in paper sacks is proving more advantageous.

There are two different types of these new scientific sacks. Firstly, those made from crepe paper which are marketed under their trade name of "Crepesacs," and secondly, sacks made of Kraft paper, with which a ply of waxed or other moisture proof paper is incorporated.

The economical advantage of this type of packing is that it saves very large sums which are now being paid by the chemical trade in carriage charges, both on sold goods and returned empties. Paper sacks, of course, are destroyed after use. The chemicals themselves are kept in excellent condition and can neither deteriorate nor contaminate other goods. In the case of hygroscopic materials a ply of moisture-proof paper is used next to the contents so that they cannot pick up the natural moisture from the atmosphere nor be affected by normal weather conditions. Paper sacks also form a valuable advertising medium, because they can be printed—not stencilled—in several colours and look more attractive than any other form of packing.

Medway paper sacks are manufactured in various capacities, but the ideal units are 56 and 112 lb. If these units could be standardised in the chemical trade it would be of very considerable assistance to the industry and would quickly lead to even lower packing costs. All the sacks made by this company are British throughout, and are made from paper manufactured by the parent company, Albert E. Reed and Co., Ltd.

Two Drums of Novel Design

THE patent "Awltoplid" drum, supplied by Todd Bros., gives the full diameter for filling and for emptying. The lid, which is the full diameter size, fits into a groove on the inside of the body, and is pressed into a cotton packing by the expanding ring. This expanding ring is worked by the bolt and wing nut in the clip. For convenience the clip hinges upwards from the drum lid, and the wing nut is unscrewed to slack off the pressure and contract the ring. The clip can then be turned completely over the top rim of the drum and used as a lever to extract the ring. There are no loose parts in the ring and clip to get lost. For making up, the lid is put on, followed by the ring, which fits into a beaded groove, and the wing nut is screwed down the bolt. The special design of the clip with its rolling joint allows the bolt to give tremendous pressure to the ring by turning the wing nut with the fingers. When the nut is screwed down as tight as possible, the clip is simply pressed down to the drum lid out of the way and wired (and to prevent pilfering—sealed) through the holes in the end of the clip to the handle on the lid. The wing nut cannot be unscrewed while the clip is down. Even if the clip should come unwired the drum is still safe, as the ring is kept under pressure until the wing nut is unscrewed. This drum is made in a range of sizes from 14 to 22 inches in diameter and 6 to 38 inches in height. THE "Hercules" drum, also supplied by Todd Bros., is a perfect package for powders. The lid is secured by a hollow locking ring tightened up with a bolt and wing nut. The lid fits over the top of the drum, thus excluding moisture. Such a drum can be sealed and can be used repeatedly. The patent hoop strengthens the top of the open container.

Container Insulation

ON account of its low figure of conductivity (0.29 B.Th.U./1 inch/per hour/per sq. ft./°F. diff., at a mean insulation temperature of 50°F) the use of "Alfol" insulation is advantageous in cases where an efficient insulation against heat or cold is required for large containers, either in sites in the works or adopted for road or rail transport. The weight of this insulation is only three ounces per cubic foot, whilst that of most other insulating materials varies between 5-20 lb. per cubic foot. As the question of weight is of the utmost importance when applied to all classes of transport vehicles, *i.e.*, large or small containers, road or rail vans, the use of "Alfol" insulation is extremely advisable in order to keep their unloaded weight as low as possible. This ensures for road vehicles a minimum annual taxation and a possible increase in the legal maximum speed of the vehicle.

On account of its extreme lightness "Alfol" insulation is unaffected by vibration. Its flexibility results from its method of application; the very thin metal foil is crumpled by hand and applied to the object in loose layers, so that any shaped object is easily covered. Its uninflammability is the result of it being an all-metal insulation. "Alfol" insulation, moreover, is non-hygroscopic, odourless and entirely free from bacteria. The layers of crumpled foil are applied in such a manner that a capillary effect, as for instance can take place in finely porous insulations, is not possible, and the insulation therefore does not absorb moisture.

All-Purpose Steel Drums

DRUMS made from British steel are being used in increasing numbers for the transport and storage of chemical products, and particular attention is being paid to the use of stainless steel in the manufacture of containers for special purposes in the chemical industry. The first cost of such drums is somewhat high, but F. Braby and Co., Ltd., who have specialised in the production of steel drums for many years, report a number of repeat orders, showing that highly satisfactory service is being obtained from them. The better types of containers are, of course, employed by chemical manufacturers on a returnable basis, so that durability is an important consideration.

Plywood Barrels which Resist Damage

THE old-established firm of W. Lusty and Sons, Ltd., have had over 60 years' experience in the manufacture of packages of every description, and would be only too pleased to render every assistance possible to firms who are interested in any type of packing cases, boxes or barrels. Their valuable experience covers from the ordinary export case to all specialities required by the brewery and mineral water trade, the chemical and paint trades, for which their noted hinge corner cases are very largely in demand, and also plywood barrels which are being supplied extensively to the various powder manufacturers. The principal features of the "Brolus" barrel is lightness combined with an abnormal resistance to damage. This barrel is particularly suitable for packing tins filled with semi-liquids as there are no inside rebates for the lid to rest on, bringing the whole surface of the body of the barrel to bear up against the tin.

Industrial Use of Molasses

Suggested Central Factory in India

THE question of industrial uses of molasses produced by the sugar factories in India came up for discussion at the last meeting of the Imperial Council of Agricultural Research, and proposals were made that in place of having a molasses export company a central factory should be started for the production of power alcohol from molasses, and a certain amount should be set aside for experimental purposes.

Mr. Burt, on behalf of the Government, stated that the production of power alcohol for use as a motor fuel was out of the question, and, as regards other industrial uses such as the manufacture of acetic acid, he promised to get information. The council, however, desired the Government of India to move rapidly in dealing with the problem of the disposal of molasses. The necessity was also recognised for the present of collecting figures showing the railway freight paid by the export company, the price paid to the factory owners in India and the price prevalent in the country to which the molasses were exported. The idea is to ascertain that the firm did not pay a low price for the molasses purchased in India, and make large profits by selling it in other countries at a high price.

ACCORDING to the research made in the Indian Lac Research Institute, Ranchi, in Bihar and Orissa, shellac lacquered surfaces possess properties of exceptional hardness, weather resistance and ability to develop a beautiful lustre on polishing. It has been discovered that these qualities are brought about by a slow physico-chemical change, which may be accelerated by heat or by certain chemical reagents. It has been discovered that it is possible, by a small addition of certain chemicals, for a shellac surface to attain in a few days or weeks that hardness and weather resistance which hitherto has taken several decades to develop. The method, however, is not yet out of the experimental stage.

New Technical Books

NITROCELLULOSE ESTER LACQUERS: THEIR COMPOSITION, APPLICATION AND USES. By Dr. Fritz Zimmer. Translated by H. K. Cameron. pp. 246. Chapman and Hall, Ltd. 18s. net.

This book presents the German point of view of a subject which has developed rapidly since 1918. The author is chief chemist and technical director of Dr. Eugen Schaal A.G., who are well known as manufacturers of lacquer and paint at Stuttgart-Feuerbach. He has made numerous contributions to the literature of his subject, and, in 1928, as a delegate to the International Illumination Congress in America, he took the opportunity to study the American lacquer and automobile industries at first hand. The author's experience of his subject has therefore enabled him to give a very clear and concise view of this recent development of applied chemistry. His book is intended to assist the chemist and the technical man in their many duties and problems in the laboratory and the works. Tabulated data of the chemical and physical constants of raw materials, descriptions of modern manufacturing and spraying plant, and consideration of the numerous uses and possibilities of nitrocellulose lacquer are included for this purpose.

* * *

ELECTRIC FURNACES: PROGRESS OF CHEMICAL APPARATUS (Elektrische Ofen: Fortschritte des Chemischen Apparatewesens). Third Part. Edited by Adopf Bräuer and Josef Reitstötter. Leipzig: Akademische Verlagsgesellschaft m.b.H. RM. 28.

The reviews of Part I and Part II of "Electric Furnaces" spoke in praise of the great service which editors Bräuer and Reitstötter had performed in undertaking to publish a collection of all the patents concerning electric furnaces. With the great and ever-increasing importance of electrically-heated furnaces, the value of such a literary collection must also continually increase. The contents of Part III include, in continuation of the second principal part concerning mechanical-constructional features, the following separate sections: Caulking appliances, walls and linings, current introduction, regulating and switch appliances, and factory appliances; in addition, the relative German and British patents, in regard to which the editors point out that in the synoptical tables the title of the patent is not put after the number and name, but, in its place, a short summary of the contents of the description of the patent is given. Part III of this work on progress proves the great service of the editors in producing this collection concerning "Electric Furnaces." The whole work can be warmly recommended.

* * *

OPTICAL ROTATORY POWER. By T. Martin Lowry. pp. 483. Longmans, Green and Co. 30s. net.

This book, which is published as one of the "Textbooks of Physical Chemistry" edited by Professor F. G. Donnan, is a record of work and progress in polarimetry, extending over a period of 120 years, from the original discovery of the optical rotatory power of quartz by Biot, in Paris, to the recent theoretical work of Max Bonn, in Cambridge. It also covers the important phenomena of "chemistry in space," including Pasteur's earliest work on molecular dissymmetry in tartaric acid and the tartrates. Further, it deals with the extension, 50 years later, of this work by Pope and Werner, from the optically-active compounds of carbon to the dissymmetric derivatives of a wide range of other elements. Part I, which is historical and general, opens with the pioneer researches of Biot and Fresnel and closes with an account of Faraday's discovery of magnetic rotatory power and of its application by Perkin to studies of the chemical constitution of organic compounds. Part II is a record of the development of polarimetric apparatus, ranging from the earliest polarising prisms of Rochon and Nicol, to the newest saccharimeters of the Bureau of Standards. Parts III and IV deal with the application of polarimetric methods to special cases such as the study of quartz, of amyl alcohol and isovaleric acid, of tartaric, malic and lactic acids, of the sugars, of camphor and borneol, and of some of Werner's coloured co-ordination compounds. Part IV—theoretical considerations—includes an account of the optical rotatory power of crystals, "liquid crystals" and solutions.

APPLIED CHEMISTRY: A PRACTICAL HANDBOOK FOR STUDENTS OF HOUSEHOLD SCIENCE AND PUBLIC HEALTH. By C. Kenneth Tinkler and Helen Masters. Vol. 1. Water, Detergents, Textiles, Fuels, etc. Third Edition revised. pp. 296. The Technical Press, Ltd. 15s. net.

In this new edition certain minor alterations and additions have been made, with particular reference to subjects such as the purification of water by chlorination and the use, as detergents, of substances other than soap. The book, considered as a whole, is of use to students preparing for the diplomas and degrees in public health at the various universities, in addition to those taking a course in household science.

* * *

HERSTELLUNG UND EIGENESHAFTEN DER KUNSTSEIDE UND STAPELFASER. By Dr. A. Zart. pp. 118. Leipzig: Akademische Verlagsgesellschaft. Rm.9.80.

On the surface rayon manufacture appears to be simply a matter of forming a cellulosic solution which is extruded through minute orifices, the resulting filaments being wound on to spools and passed on to the weaver, dyer and the numerous other invaluable helpmates of the older textile industries. Actually, of course, the production of synthetic textile fibres forms a distinctive branch of technology depending for efficiency in no small measure upon the application of physical chemical principles. Presenting as it does a lucid and up-to-date account of the scientific basis of the three great subdivisions of the synthetic textile industry—viscose, cellulose acetate and cuprammonium cellulose solution—Dr. Zart's monograph fills a conspicuous gap. With all branches of the great new industry throughout the world enjoying an unexampled prosperity which inevitably opens out the prospect of further expansion, it is but natural that more and more chemists will find a career in it. To such, Dr. Zart's work will form a most suitable introduction.

* * *

HOCHPOLYMERE ORGANISCHE NATURSTOFFE. By Dr. H. Saechtling. Brunswick: Friedr. Vieweg and Sohn. pp. 124. 8 marks.

OF fundamental importance as are the recent discoveries in the chemistry of high-molecular natural products, a good many industrial chemists dealing with such materials as cellulose, rubber and proteins lack time and opportunity for keeping abreast of these developments. Dr, Saechtling's admirable little monograph should consequently appeal with exceptional force to this circle of potential readers. With the discrimination that stamps the specialist, he discusses—to mention but one chapter—the part played by X-ray analysis in elucidating the structure of the molecules of cellulose, proteins, rubber and other basic raw materials. Other chapters deal equally successfully with the applications of optical and organic chemical methods to problems of structure, while a most instructive section is that in which recent syntheses of highly polymerised substances by Staudinger and others and their value as a weapon for estimating the molecular dimensions of dissolved natural substances are taken in review. The value of this excellent little volume is greatly enhanced by the appended comprehensive bibliography covering the literature till December, 1934.

* * *

COLLOID CHEMISTRY IN CERAMICS (Kolloidchemie in der Keramik). By Dr.-Ing. Hans Kohl (reprint from "Kolloidchemische Technologie"). Dresden and Leipzig: Theodor Steinkopff. RM. 4.

The first comprehensive publications on "Colloid Chemistry in Ceramics" appeared in the Transactions of the Ceramic Society in 1929. Eric J. Vickers, M.Sc., F.G.S., published "The Application of Colloid Chemistry to the Study of Clays I and II" (1929, p. 91-100 and 124-147), with the most extensive collection of literature on this special field. A few weeks later (in the middle of 1929) Dr. Felix Singer published in his book, "Das Steinzeug" ("Stoneware"), a comprehensive representation of colloid-chemical processes in stoneware manufacture. Meanwhile, very numerous single publications have appeared which show and further the significance of colloid-chemical processes for the ceramic science and industry. Now Dr. Kohl has undertaken to publish a comprehensive book on "Colloid Chemistry in Ceramics." The

author has succeeded well in his task which is worthy of acknowledgment. He shows how this very ancient empirical industry can be better understood on the one hand by scientific knowledge, and on the other by furthering the industry itself, hastening its development and showing absolutely new paths. Long ago colloid chemistry ceased to be a theoretical science for ceramics, and for a long time the practical ceramist has availed himself of colloid-chemical processes in the factory. Very many quite new branches of ceramics are absolutely unthinkable without colloid-chemical science. Therefore it is interesting to see what a great deal of light Dr. Kohl throws on special fields of ceramics from the point of view of the colloid chemist. His short, comprehensive presentation gives an excellent survey of the application of colloid-chemistry analytical and working methods in ceramics.

* * *

WIE SETZEN WIR DIE VERLUSTE AN FLUCHTIGEN LOSUNGSMITTEL HERAB (Solvent Recovery Methods). By Dr. E. Schwarz. pp. 150. Berlin: Allgemeiner Industrie-Verlag G.m.b.H. 9 marks.

Considering the economic importance of efficient solvent recovery in industry it is really surprising how few special text-books on the subject have been published. The present work is a valuable contribution to the theoretical and practical aspects of solvent recovery processes. In fact, the general section occupying the first half of the book can be profitably read by students and works chemists as a treatise on the physical and chemical properties of solvents. In this connection the appended tabulated list of properties of 44 principal solvents itself forms a powerful recommendation to add the volume to the works library. It contains just that information on flash points, density, solubility in other solvents, specific solvent action and many other points which so often eludes the harassed process chemist at critical moments. The value of this table, by the way, could be enhanced by pointing out that pure methyl ethyl ketone (which is now on the market) is not a solvent for cellulose acetate, thus differing from the commercial product which contains a proportion of acetone. In the flash point column there is no information as to the method or methods used in arriving at this most important figure. The second half of the work has less to commend it, since it is manifestly impossible in less than 60 pages to give an exhaustive account of solvent recovery methods in the chief solvent-using industries. Regarded as a bird's-eye view of the subject, however, the author has succeeded remarkably well. After complete assimilation of this work, the works chemist and engineer should be amply equipped when called upon to decide upon the adoption of one or other of the solvent recovery plants and processes now on the market.

Company Registrations at Somerset House

258 New Chemical Concerns Formed in First Half of 1935

ACCORDING to the half-yearly statistical report compiled by Jordan and Sons, Ltd., company registration agents, Chancery Lane, London, relating to new companies registered in England during the six months ended June 30, 258 new chemical companies were registered with a total capital of £2,340,578. The signs of recovery which were apparent in the reports for the first and second half of 1934 are more than maintained. The number of new companies registered during the first half of 1935, as compared with the corresponding period of 1934, indicates an increase of 189. A tabular statement shows the increase in "public" companies to be only two, whereas private companies are up by 187. The actual increase in "public" ventures (as the term is commonly understood) is, however, greater than those figures appear at first glance to suggest. Companies "limited by guarantee" and "associations not for profit" (as indicated in the footnote to the table), are included with the public companies, and whereas the 230 "public" companies incorporated in January-June, 1934, included 53 such undertakings (leaving 177 companies incorporated for commercial objects), the 232 of January-June, 1935, include only 42 (leaving 190), an increase of 17 in the number of public companies incorporated for trading and commercial purposes.

The aggregate nominal capital of the companies incorporated during the period is down by £9,317,434 (£8,386,991 "public" companies and £930,443 "private" companies). In the first six months of 1934, thirteen "millionaire" companies were incorporated, and one of those (Cunard White Star, Ltd.) had a capital of £10,000,000. Only seven such concerns have made their debut during the first half of 1935, and none of them had an initial capital approaching ten millions. Two companies which started life this year with nominal capitals which together only amounted to £400 have increased their capitals so that the two capitals aggregate £8,522,100, which practically balances the decrease in the initial total capital of public concerns. In any case it is not these huge capitals which indicate the trend of affairs, many of the companies concerned being reconstructions, involving no "new money." There has been a marked improvement in the average "quality" of the registrations (from the viewpoint of business activity), and altogether the position is decidedly better than might appear from a casual glance at the figures.

The seven companies registered with initial nominal capitals of £1,000,000 and upwards during January-June, 1935 (all public companies), included C.I.M. Holdings, Ltd. (£1,333,333), Powell Duffryn Associated Collieries, Ltd. (£4,500,000), and Aspro, Ltd. (£1,000,000). There were also thirteen concerns with capitals of £500,000 and upwards, but under £1,000,000, including British Cellophane, Ltd. (£900,000), Universal Grinding Wheel Co., Ltd. (£600,000), Consolidated Rubber Manufacturers, Ltd. (£600,000), and Darlington and Simpson Rolling Mills, Ltd. (£572,500).

"Unlimited" companies and "companies limited by guarantee" are rarely formed for trading purposes. Unlimited companies are usually registered for the acquisition and management of private estates (land or investment), and "guarantee" companies are chiefly associations for religious, social, scientific, trade protection and similar purposes. One of the rare unlimited companies apparently incorporated for trading is Stanley Elmore Co., registered with £200,000 nominal capital. This appears in the "chemicals" group.

The following items relating to chemical and allied companies are extracted from the statistics:

Classes.	Public Companies. Number Registered.*	Public Companies. Capital.	Private Companies. Number Registered.	Private Companies. Capital.	Totals. Number Registered.	Totals. Capital.
		£		£		£
Cement, etc.	11	1,890,000	103	975,600	114	2,865,600
Chemicals	4	1,060,100	254	1,280,478	258	2,340,578
Engineers	15	3,058,600	347	1,464,124	362	4,522,724
Food	12	1,134,600	526	2,852,829	538	3,987,429
Glass and Pottery	—	—	40	203,325	40	203,325
Laundries	1	150,000	55	186,950	56	336,950
Leather	—	—	36	120,010	36	120,010
Metals	2	465,000	47	229,550	49	694,550
Oil	2	1,633,333	21	158,308	23	1,791,641
Rubber	1	600,000	22	118,400	23	718,400
Textiles	5	587,000	231	1,736,050	236	2,323,050
Others	179	24,290,000	4,845	28,990,129	5,024	52,280,629
Totals (for first half of 1935)	232*	34,869,133	6,527	38,315,753	6,759	73,184,886
Corresponding figures first half of 1934	230	43,256,124	6,340	39,246,196	6,570	82,502,320
Corresponding figures first half of 1933	155	16,046,275	5,485	26,279,694	5,640	42,325,969
Corresponding figures first half of 1932	108	5,254,458	4,985	28,803,098	5,093	34,057,556

* In this column are included 42 "Companies Limited by Guarantee" and "Associations Not for Profit" without share capital, such companies being technically public however small the membership may be.

MANUFACTURING concerns in the United States reported a consumption of 1,102,500 lb. (preliminary figures) of synthetic camphor during the period December 18, 1934, to May 31, 1935, according to the United States Tariff Commission. Preliminary figures indicate that the consumption of crude natural camphor during the first six months of 1935 was in excess of 1,300,000 lb.

Annual Meeting of Benn Brothers, Ltd.

A Year of Successful Stabilisation

THE thirty-ninth annual general meeting of Benn Brothers, Ltd., publishers of THE CHEMICAL AGE and other journals, was held on August 2, at Bouverie House, Fleet Street, London. Sir Ernest J. P. Benn, chairman, presided. "I approach the balance sheet first," said Sir Ernest, "in the safe business way, with the mind of the broker's man shutting up and seeing what would be left if it was a question of liquidation. I count your assets and pay off your liabilities, but leave out of account your goodwill. After this fantastically drastic treatment there would have been a payment of 22s. in the pound to the ordinary shareholders last year and this year they would have received 23s. in the pound. This means there has been a 5 per cent. increase in the capital value of the ordinary shares, leaving out of account the item of goodwill, and in the newspaper business the only asset that is really important and on which it wholly depends is your earning capacity expressed in your goodwill."

Still looking through the dismal spectacles of the broker's man, Sir Ernest proceeded, the position he found to-day was more satisfactory, and more sound than ever. He had been examining the figures from another aspect. There were shown on the balance sheet reserves amounting to roughly £120,000, and an issued preference share capital of over £80,000, which totalled together £200,000. That sum represented the result of fifty-five years of carefully putting aside a margin of profit of an average of between £3,500 and £4,000 a year. That money, as he read the figures, was invested in Bouverie House as to £140,000, £40,000 remained in Ernest Benn, Ltd., and approximately £20,000 in gilt-edged and other securities. They could glance back over fifty-five years of saving and consolidation and it was enlightening to perceive what had been achieved, and to realise the consistent effort that had been made throughout the period to set up, not a catch-penny, day-to-day, or week-by-week publishing effort, but a really solid, secure commercial institution with sound foundations, which was likely to survive—which was, in fact, regarded, like any of the great institutions of the city, as permanently settled and established.

Permanency was an important consideration to bear in mind in these days when there were few things left with any foundations, and he was anxious that it should be understood by the staff, and that their main objective was for everybody to be able to say—"We are in a sort of Bank of England and we are safe. We are going on." It was the sort of mentality which would enable the staff to appreciate the constant effort that had been made towards economy in the last few years.

The chairman went on to emphasise that the company was paying a dividend of 15 per cent. The advertising and publicity business depended upon the idea of success, he said. If they could keep the flag flying and tell the world they were successful, then that success would breed success. Whatever they might think of that philosophy he was convinced it was the hard-boiled practical truth. "For myself," he added, "I firmly believe that some of the tendency for revenues to shrink with which we have had to grapple during the last four or five years can be attributed to the reduction of the dividend from 20 per cent. four or five years ago."

Reviewing the past year, Sir Ernest said it had been one of stabilisation. They heard a good deal of that curious process, but it was what had been occurring in their own business. There had been no developments, though they were in a position to undertake any development should the opportunity arise and should they consider it wise. Under the uncertain conditions which had prevailed during the last twelve months there had been no opportunities for development they had considered wise, and they had therefore consolidated their position. They awaited the time when a prospect of serious development might come their way.

"Our purpose here," concluded Sir Ernest, "is to establish an institution and to afford permanency and security, things which are very rare and very precious in these times, to fight every temptation to run after some fresh stunt which will last only a few months. We strive to remember that we are the guardians of a tradition that will oust all that sort of thing and that this old firm will be flourishing in years to come when the world has got over its post-war madness. Our business is to render service, to promote confidence, and the acid test of that is the success we ourselves attain, the dividend we pay." On that note he moved the payment of dividends at the rate of 3 per cent. on the preferential shares (making 6 per cent. for the year), 10 per cent. on the ordinary shares (making 15 per cent.), and 2s. on the deferred shares (making 3s.).

Mr. GORDON ROBBINS, deputy chairman, seconded the resolution. The directors' report, he said, paid tribute to the devoted work of the staff. He saw as much of the staff as anybody in the building. "I am very proud of the staff," Mr. Robbins declared. "We have experience and age, and youth and enthusiasm, and there is a fine strain of loyalty running through the building."

The re-election of the auditors, Cassleton, Elliott and Co., was carried unanimously on the motion of Mr. B. A. Glanvill, seconded by Mr. R. L. Webb, and the meeting terminated with a vote of thanks to the chairman, proposed by Mr. J. A. Knivett and seconded by Mr. W. Vestey.

Britain's Recent Commercial Policy

Federation of British Industries' Survey

THE Federation of British Industries has compiled a survey of Britain's recent commercial policy, which sets forth in detail the results of British commercial policy since the construction of a British protective tariff, the measures taken for the rehabilitation of British agriculture, the conclusion of the Ottawa Agreements and the negotiation of trade agreements with a number of non-Empire countries. Special consideration has been given to certain long-range factors which must control British commercial policy and the future development of world trade. These are itemised as the trend of population growth, the policy of agricultural self-sufficiency prevailing in Europe, and the growing industrialisation of agricultural areas overseas.

The Federation places in the forefront certain conclusions for which the facts contained in the survey are the justification and basis. The main conclusion to be drawn from the survey is that our commercial policy, taken as a whole, has secured a remarkable degree of economic recovery for this country, as compared with that of other countries during the same period. In the home market the consumption of domestically-produced goods has substantially increased; in the Empire markets United Kingdom exports have advanced, both in value and as a percentage of our total exports; with the trade agreement countries, British exports have also gained ground. It is a fair deduction from this state of affairs that the best course for Great Britain is to continue and extend the policy which the Government has pursued with success during the last few years.

It has to be admitted that although the tendency of our trade has been in the right direction, the actual improvement registered does not warrant any feeling of complacency. Too great a proportion of our revival in industrial activity has been due to the demands of the home market; too little has been due to a real development of the export trade which is vital to the future prosperity of the country.

How is this recovery, which essentially depends upon stimulating the growth of international trade as a whole, to be brought about? The remedy usually advocated is to reduce

"trade barriers" and to endeavour to achieve a stabilisation of exchanges. Trade barriers and unstable exchanges are not, in the opinion of the Federation, the basic cause of world depression. They are a symptom, and the result of unsound economic policy, both national and international, on the part of the countries of the world. To-day, the industrial countries are devoting their attention towards stimulating their agriculture, often without any regard to the economic possibilities involved. Agricultural countries are similarly embarking upon industrial production, irrespective of its economic justification. Unless this policy is kept within reasonable limits, there would appear to be little likelihood of building a firm foundation for a resumption of international trade on a large scale, which depends in essence upon the exchange of manufactured goods for agricultural produce and raw materials.

So far as the commercial policy of Great Britain is concerned, three points stand out:—

(a) Industrial protection has been a success, since it has been designed to give protection to industries which are economic and efficient.

(b) The results of the Ottawa Agreements have been to increase inter-Imperial trade, although so far the overseas Dominions have reaped greater benefits than has the United Kingdom. The importance of increasing the economic prosperity of the Empire as a unit is so great that British industrialists have taken a broad view of the disproportion in the advantages which have accrued from Ottawa. It is suggested, however, that it is essential, in the long run, for the development of the economic life of the Empire on a sound and enduring basis, that there should be closer relation between the treatment meted out to and received by each part of the Empire from the other constituent units.

(c) The trade agreement countries have been the most satisfactory of our foreign customers. Some of the existing trade agreements are due for revision in a short time. Other agreements are contemplated. In both cases it is suggested that one fact above all should be borne in mind—the outstanding importance of the British market to overseas sellers. It is urged that the "Most Favoured Nation" clause should not be included more or less automatically in any treaties with foreign countries, but should be regarded as a valuable concession by this country, requiring an adequate and substantial *quid pro quo*.

A Chemical Conference at Sunbury

An Insistent Demand for Development

We are indebted to the Editor of "The Naft," the house magazine of the Anglo-Iranian Oil Co., Ltd., for the loan of the accompanying photograph taken at the company's tenth annual chemical conference which opened at Sunbury on July 1 and extended over a period of four days. The conference, which was attended by members of the staff from head office, Iran, Llandarcy, Scotland and France, as well as by the Sunbury members, was inaugurated by Mr. Jameson, who said the work of the chemical staff in all parts of the company was highly appreciated.

The first of these conferences, he recalled, was held when the company was just bringing on to the market the "New BP," a fuel with an octane number that, in comparison with the rating of present-day motor spirits, would be considered very low indeed. Referring to the work of the engine research side, Mr. Jameson said he believed it would bear comparison with anything done anywhere; and he went on to point out that it would be a great achievement if one day they could lead the engine designer instead of following him. He called attention to a new method of measuring human effort which had recently been developed, and showed that it was as important to take this measurement into account when considering design of plant as the measurements of consumption of fuel, water and chemicals.

Dr. A. E. Dunstan stressed the benefits that were accomplished by personal contact and said he would like to see the conference broadened into a miniature "World Petroleum Congress," to include chemists, geologists and geophysicists. The insistent demand for development of existing processes had absorbed so much of the research department's time that original research, perhaps, had somewhat suffered. In the field of pyrolysis and polymerisation, however, the company was a pioneer. Pyrolysis of the lower paraffins was first developed by the company and to-day they were just on the point of reaping their reward.

Mr. Smith, chief research chemist, pointed out that this was the one opportunity which the Sunbury staff got to discuss with operators practical difficulties of production and refining. He thanked everybody for coming and hoped that they would do their utmost to tell all the Sunbury staff everything they could about refinery operations.

Dr. Thole said that including shale oil they had three crudes to handle which, though, like the curate's egg, excellent in parts, were also full of difficulties that could be counted on to stimulate ideas.

The conference proceeded with a series of papers on various subjects dealing with the company's work during the past year.

Non-Flam Celluloid Plastics and Plasticisers

By ARTHUR JONES, M.Sc., F.C.S.

THE early attempts to produce non-flam celluloid by the use of other and non-flam plasticisers did not meet with complete success as they lacked the beauty and tensile strength of celluloid as well as its easy working and elasticity. Hence the attention given to the commercial production of other non-flam esters and ethers of cellulose like cellulose acetate.

Regarding the fire resistance of a cellulose acetate film, it should not be forgotten that though the cellulose esters may themselves be non-flam there is always a considerable amount of plasticiser left in the film or moulded article and hence, for complete resistance to burning, the plasticiser must absolutely resist burning, and it follows that no inflammable high-boiler solvent should be used in excess as it would be left in the film. Cellulose acetate is more particularly used because of its intense non-flam properties, but generally the solvents and plasticisers for cellulose acetate are not the usual commercial solvents which are so freely available for nitrocellulose.

Recent Developments

It is only within the last few years, because of the greater knowledge of colloidal solutions, swelling and plasticisation, etc., that a range of suitable solvents has been made available for cellulose acetate or non-flam celluloid as it is often called.

Campbell, THE CHEMICAL AGE, August, 1932, gives only triphenyl phosphate, diethyl phthalate, triacetin and benzyl alcohol as plasticisers, but in the last three years there has been rapid development of many commercial solvents like the new range of glycol esters and ethers (and their substituted products), sulphonamides, glycerol esters, chlorinated esters and aldehydes (particularly the aryls), and cyclohexanones and their derivatives, the two latter having very great non-flam properties. The function, choice and stability of the plasticiser, however, is of extreme importance and has only recently received proper attention. It is believed there is a loose chemical combination between the plasticiser and the cellulose ester. Investigators have also distinguished between a true plasticiser and a softener, *i.e.*, one that actually enters the cellulose micelle and combines with same and one that remains outside and plasticises merely by reducing friction of the particles on bending. Camphor is the doyen of true plasticers, and castor oil is the example *par excellence* of a mere frictional softener plasticiser.

The Glycol Ether and Ester Group

Amongst the glycol ethers and esters are di- and tri-glycol stearates and oleates, which are important waterproofing and polishing agents; the glycol ethers, cellosolve, ethyl glycol, etc., which are mono-ethyl glycol ethers and free from residual odour; and also dimethyl and diethyl glycol phthalate as well as carbitol (monoethyl diethylene glycol) and the cellosolve substituted esters like methyl cellosolve, cellosolve acetate, etc. Amongst the sulphonamides are p-toluene sulphonamides known commercially as Plastol C11 or Camptrosal. The glycerol ester and ether group contain di- and triglycerol acetates, ditolyl glycerol ether, abracols 333 and 777, and the glycollates like Santiciser M_{17} (methyl phthalyl ethyl glycollate), Santiciser E_{15} (ethyl phthalyl ethyl glycollate), Santiciser B_{16} (butyl phthalyl butyl glycollate), etc., but although excellent plasticers they possess no fire resistance.

The cyclohexanones and their derivatives are excellent non-flam plasticers and high-boiler solvents and possess rather special properties of pentration and emulsification, but they smell very badly and it takes a long time for the residual odour to go away. This class contains the hexalines, hexanones and the sextones, sextols and their acetates and esters. Sextone (cyclohexanone), boiling range 154° to 158° C., is a medium-boiler solvent of strong penetration, useful to admix refractory resins with cellulose acetate. Methyl cyclohexanol (Sextol), boiling range 160° to 180° C., is also a good solvent for resins and a diluent for cellulose acetate. Methyl cyclohexanol oxalate (Barkite), boiling range 190° to 200° C., is a useful non-flam plasticiser to nitrocellulose and cellulose acetate; it is claimed never to cause discolouration in white enamels as Tricresyl phosphate does. For films and sheets 20 per cent. of Barkite is recommended.

The halogen substitution bodies include the Cetamolls (I.G.), which are chlorinated tricresyl phosphates, and the halogen esters and aldehydes (Eastman Kodak Co.), such as p-bromo benzaldehyde, ethyl chloro carbonate, ethyl bromo propionate, methyl bromo benzate, etc. Tricresyl and triphenyl phosphates, the usual plasticisers, act as fire resistants, but the film will burn, though with difficulty, whereas all the halogen plasticisers give films and moulded articles that are completely non-flam and will not burn under any circumstances. Rights to use some of these products are limited owing to patents for some of them, but the aryl halogen substitution products, like the Cetamolls, are freely available. The boiling range of the Cetamolls is 210° to 220° C.; at 225° C. they certainly show a flash point, but the vapours given off only burn as long as they are in direct contact with a flame. They are insoluble in water and in petroleum, but dissolve in alcohols, esters, ketones, hydrocarbons and chlorinated hydrocarbons. They possess good gelatinising properties for cellulose acetate, and are compatible with other softeners as well as with resins, chlorinated rubber, etc.

Films containing about 10 per cent. Cetamoll QU only char over a flame after melting and extinguish themselves immediately the flame is removed. For moulding non-flam celluloid articles as much as 25 to 75 per cent. of Cetamoll QU on the weight of the cellulose acetate may be used. Some absorption of water (about 2 per cent.) with considerable swelling occurs with most acetate mouldings; this is because many cellulose acetates that are on the market are really partly hydroxy acetates. If the true triacetate is used no absorption of water and swelling occurs. This may be minimised and the moulding can be made to slip out of the moulds easier by combining a trace of a fatty stearate, like butyl stearate or cyclohexanol stearate, in the mix. To obtain non-inflammability, resource is often made to loading with inert pigments, like barytes or slate powder, but in cases where beauty, translucency and resilience like that of celluloid are required the material cannot be so loaded, and it is then that the chlorinated plasticisers are useful.

Determination of Calorific Value

The B.T.L. Calorimeter

THE B.T.L. bomb calorimeter manufactured by Baird and Tatlock (London), Ltd., complies with the requirements of the Institution of Petroleum Technologists, and also those of the British Standards Institution. Stainless steel is used for the body of the bomb, but for the lid and union nut an alloy of high thermal conductivity has been chosen, the protection against corrosion being a heavy deposit of chromium. The stirring mechanism consists of an enclosed impeller direct-coupled to an electric motor, and the pressure-tight joint between the lid and the body of the bomb is made on a ring or gasket of special composition. A valve similar to a Schrader motor tyre valve is provided and its adoption not only dispenses with a packing gland but considerably simplifies operation. The oxygen itself, coming from the cylinder, opens the valve when filling the bomb, and when the bomb is full, the internal pressure closes it. Two stainless steel electrodes are provided, each of which has a saw cut, in which the wire fuse is gripped by a sliding sleeve.

The method of using the high pressure bomb for the determination of calorific values consists in igniting by electrical means a weighted quantity of fuel enclosed in a tomb filled with oxygen under pressure. From the rise in temperature of the water in which the bomb is immersed, the calorific value of the fuel is calculated. Corrections are necessary for the temperature loss which takes place while the rise is in progress, the thermometer error, and the acids formed.

The B.T.L. bomb calorimeter outfit is supplied either with direct motor driven stirring device, or with hand driven propeller stirring device.

Continental Chemical Notes

Sweden

AN IMPORTANT DISCOVERY OF ORE DEPOSITS is reported from the province of Jämtland, analysis revealing a silver content of 52 grams per ton and a gold content ranging from 0.3 to 8 grams per ton. The ore is particularly rich in copper (11.3 per cent.).

Russia

ANTHRACENE IS MUCH LESS SOLUBLE than phenanthrene and carbozole in liquid ammonia. On this observation is based a new method of anthracene purification described by Monoszon and co-workers in the " Russian Journal of Chemical Industry," April, 1935.

France

NEW COMPANY REGISTRATIONS include the following: Prospecta S.A., of 128 Boulevard Haussmann, Paris, with a capital of 150,000 francs (acquisition and exploitation of mineral deposits, particularly of steatite); Soc. pour les applications du carbone, of 55 Avenue Kleber, Paris, with a capital of 400,000 francs (manufacture and sale of coal products); Laboratoires Nollet, of 47 rue Nollet, Paris, with a capital of 250,000 francs (manufacture and distribution of cosmetic products); Usine Bio-chimiques d'Alfortville, of 43 rue Emile-Zola, Alfortville (Seine), with a capital of 25,000 francs (manufacture and sale of chemical and biological products).

THE PROSPECTS OF POPULARISING the wider use of metallic magnesium were discussed at length at the annual meeting of shareholders of the Societe Bozel-Malétra, held on June 26. This company started to utilise its electric power resources for making the metal in 1933, and the sales have largely compensated for the reduced outputs of calcium carbide and ferrosilicon. In due course it is anticipated that magnesium sales will rival those of aluminium, a metal which required 30 years to reach its present significance. Being lighter than aluminium, however, its applications will be in rather different fields.

RESULTS OF INVESTIGATIONS aiming at new uses for the propane-butane mixture (" Skellgas ") of petroleum are published by Dr. R. Fussteig, in the July issue of " Chimie et Industrie." A furnace was concentrated from a special alloy steel containing chromium, nickel and cobalt, and so designed as to be applicable for both hydrogenation (under 200 atmospheres) and cracking (under 15 atmospheres) experiments. The investigator concludes that the propane-butane fraction is highly suitable for conversion into motor spirit, while pyrogenic decomposition yields unsaturated bodies suitable in turn for alcohol manufacture.

Letters to the Editor

Professor Armstrong Replies to Sir Ernest Benn

SIR,—Sir Ernest Benn is a good, breezy speaker for a school prize-giving. Happily he does not talk the cant common at such meetings. Those who speak on these occasions usually know nothing of the ghastly pitfalls and difficulties of school and can but indulge in platitude, the more when they are retired headmasters: these invariably preach what they have not practised. It is amusing that, whilst I am writing down Sir Ernest's class, he not only brushes mine aside but also the politician. Let us agree that honours are easy all round.

We all need to go on the road in the beginning: unfortunately the foundation for such travel is not being laid in the schools. I would have every would-be professor, politician and industrialist serve five years before the mast—on mere whole bread and cheese and onions—going round the world, before professing either as teacher in politics or in commerce, especially in commerce. Mr. Wedgwood Benn, M.P., only recently has shown what can be learnt by travel: his politics can scarcely be what they were before he so well used his eyes in many lands.

Active-minded men like Sir Ernest Benn have a public duty to perform—to visit the schools with which they are connected and see that they are trying to prepare the children to go on the road—to have some real understanding of common things; some clear picture of the world in their minds; some real sense of duty; some degree of receptivity; above all, a clear sense of their ignorance and the need of continuing to learn. At present they are put off the road in every particular. The questions set at the recent School Certificate Examinations by the London University are sufficient witness to the entirely artificial character of the teaching. English is not taught—either writing or reading. Shakespeare is made nauseous by a superanalysis which is entirely premature. Mere Thibetan praying wheels, the schools are forced to cram and crowd in information, without giving any systematic instruction in the art of learning and of using knowledge. Far too much is attempted; far too little done. No element of imagination is inculcated, no sense of the beauty of the natural world; neither is any method put into the child's madness nor any enthusiasm cultivated. A sheltered class, most teachers never having been upon the road of life have no conception of its needs. New times demand new manners and new men! A revolutionary change in system is called for—at least a few bold experiments.

To-day no freedom of thought in teaching is allowed anywhere nor possible. The New Inquisition—the Examination Fiend—forbids, the excuse being it is done to satisfy the Sir Ernest Benns! Young souls are tortured to provide city slaves. The episode of the Board of Education Inspector so persistently brought before the House of Commons recently by Sir Gerald Hurst may have been over-emphasised in so far as the particular individual was concerned; the attitude to which exception was taken, however, has long been that of the Board in general. We shall not make our schools of worth until they are entirely withdrawn from the influence of the present Board and a new school of thought introduced—then only will competent teachers be forthcoming. County Council Education authorities are equally at fault.

Thoroughly abandoned as I am as a Professor, a solid seventy years of experience of teaching has given me more insight into the problems of education and shattered most of my early hopes. My views are summarised in my book on " The Teaching of Scientific Method " (Macmillan). Perhaps Sir Ernest will glance at this and then see a little more clearly where the shoe pinches, why it is that so few are well prepared to face the adventure of life. I trust I shall not be regarded as entirely vain if I refer to my book in explanation of the sterility which reigns in education: the sterility of the classic mind. A book with such a title—a book on the method of making and using knowledge—should command a fair sale, apart from any question of authorship. Even Sir Ernest Benn, accustomed to small return as he must be, will agree with me that a sale of under 3,000 copies in even 30 years is not to be reckoned as excessive nor as an indication of any ardent desire on the part of teachers to practise method.

Sir Ernest Benn is opposed to the growing tendency of the State to interfere in our affairs. This must happen the more the longer we welter in ignorance and are able to act individually, but in wise co-operation with others. To maintain the democracy we must raise the standard of general intelligence. The Minister of Transport is taking the greatest interest in the way in which the roads are used as highways to the grave. The Ministry of Education takes no notice of the way in which the schools are being used to maim the souls of the rising generation—prolonging the process is the chief concern at present, not preparation for the road.

I trust my use of the English tongue has not been " perfect enough to enable me to get away with the most utter nonsense imaginable," but poor enough to be understood.—Yours faithfully,

HENRY E. ARMSTRONG.

Weekly Prices of British Chemical Products

Review of Current Market Conditions

CONDITIONS have remained quiet during the week and business has been steady. Slight changes in the prices of a few rubber chemicals and wood distillation products are announced. In the nitrogenous fertiliser market the price for neutral quality sulphate of ammonia, basis 20.6 per cent. nitrogen, has been announced at £7 5s. per ton, less 10s. 6d. per ton for August relivery. This price of £6 14s. 6d. per ton delivered to farmer's station in 6-ton lots is the same as for August, 1934. For delivery later than August no prices have yet been announced. It is understood that prices for nitro-chalk and nitrate of soda for the new season will be announced during the coming week. In the meantime prompt sales are being made at the June prices of £7 5s. per ton for nitro-chalk and £7 12s. 6d. per ton for nitrate of soda, delivered in 6-ton lots to farmer's nearest station. Up to the present no prices have beena nnounced for concentrated complete and nitrogen phosphate fertilisers for the year 1935-36, and the June prices remain in force for prompt delivery. Unless otherwise stated, the prices below cover fair quantities net and naked at sellers' works.

MANCHESTER.—Slow trading conditions have been reported this week on the Manchester chemical market. A good many buyers in the district are away on holiday, and it was obvious from the number of people who attended the market on 'Change on Tuesday that in many instances the Bank Holiday break had been extended. Under the circumstances little fresh business was possible and reports have been almost general both as to the scarcity of new orders from the point of view of numbers, and the relatively unimportant quantities sold. Most descriptions of heavy chemicals have been thus affected, and the seasonal conditions have been reflected also in the call for supplies, deliveries in a number of instances having been suspended for the time being. The market, however, keeps steady and actual changes during the week have been unimportant. Uninspiring reports are forthcoming as to conditions in the by-products trade. Buying interest has been extremely poor in most cases, though the causes are believed to be mostly seasonal.

SCOTLAND.—Business in chemicals has been rather quiet during the week with very few changes in values. Prices generally continue very firm, and inquiries for forward deliveries are fairly frequent.

General Chemicals

ACETONE.—LONDON: £65 to £68 per ton; SCOTLAND: £66 to £68 ex wharf, according to quantity.

ACID, ACETIC.—Tech. 80%, £38 5s. to £40 5s.; pure 80%, £39 5s.; tech., 40%, £20 5s. to £21 15s.; tech., 60%, £28 10s. to £30 10s. LONDON: Tech., 80%, £38 5s. to £40 5s.; pure 80%, £39 5s. to £41 5s.; tech., 40%, £20 5s. to £22 5s.; tech., 60%, £29 5s. to £31 5s. SCOTLAND: Glacial 98/100%, £48 to £52; pure 80%, £39 5s.; tech. 80%, £38 5s. d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £39; tech. glacial, £52.

ACID, BORIC.—Commercial granulated, £25 10s. per ton; crystal, £26 10s.; powdered, £27 10s.; extra finely powdered, £29 10s. packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. SCOTLAND: Crystals £26 10s.; powder, £27 10s.

ACID, CHROMIC.—10½d. per lb., less 2½%, d/d U.K.

ACID, CITRIC.—11¾d. per lb. MANCHESTER: 11¾d. SCOTLAND: 11¾d.

ACID, CRESYLIC.—97/99%, 1s. 8d. to 1s. 9d. per gal.; 98/100%, 2s. to 2s. 2d.

ACID, FORMIC.—LONDON: £40 to £45 per ton.

ACID, HYDROCHLORIC.—Spot, 4s. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works. full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £48; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £53; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works, SCOTLAND: 80°, £24 ex station full truck loads.

ACID, OXALIC.—LONDON: £47 17s. 6d. to £57 10s. per ton, according to packages and position. SCOTLAND: 98/100%, £48 to £50 ex store. MANCHESTER: £49 to £55 ex store.

ACID, SULPHURIC.—SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—1s. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. SCOTLAND: 1s. 0¼d. less 5%. MANCHESTER: 1s. 0¾d. per lb.

ALUM.—SCOTLAND: Lump potash, £8 10s. per ton ex store.

ALUMINA SULPHATE.—LONDON: £7 10s. to £8 per ton. SCOTLAND: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE. SCOTLAND: Lump, £30 per ton; powdered, £33, in 5-cwt. casks d/d buyers' premises U.K.

AMMONIUM CHLORIDE.—LONDON: Fine white crystals, £18 to £19. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

ANTIMONY OXIDE.—SCOTLAND: Spot, £34 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 3d. per lb.; crimson, 1s. 5½d. to 1s. 7d. per lb., according to quality.

ARSENIC.—LONDON: £16 10s. per ton c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r mines. SCOTLAND: White powdered, £23 ex wharf. MANCHESTER: White powdered Cornish, £22 to £23, ex store.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARIUM CHLORIDE.—LONDON: £10 10s. per ton. SCOTLAND: £10 10s. to £10 15s.

BARYTES.—£6 10s. to £8 per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.r. London.

BLEACHING POWDER.—Spot, 35/37%, £7 19s. per ton d/d station in casks, special terms for contract. SCOTLAND: £8 to £9 5s.

BORAX, COMMERCIAL.—Granulated, £14 10s. per ton; crystal, £15 10s.; powdered, £16; finely powdered, £17; packed in 1-cwt. bags, carriage paid home to buyer's premises within the United Kingdom in 1-ton lots.

CADMIUM SULPHIDE.—3s. 4d. to 3s. 8d. per lb.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums.

CARBON BISULPHIDE.—£31 to £33 per ton, drums extra.

CARBON BLACK.—3¾d. to 4¼d. per lb. LONDON: 4¼d. to 5d.

CARBON TETRACHLORIDE.—SCOTLAND: £41 to £43 per ton, drums extra.

CHROMIUM OXIDE.—10¾d. per lb., according to quantity d/d U.K.; green, 1s. 2d. per lb.

CHROMETAN.—Crystals, 3½d. per lb.; liquor, £19 10s. per ton d/d.

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r. or ex works.

CREAM OF TARTAR.—£3 19s. per cwt. less 2½%. LONDON: £3 17s. per cwt. SCOTLAND: £3 16s. 6d. net.

DINITROTOLUENE.—66/68° C., 9d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

FORMALDEHYDE.—LONDON: £25 10s. per ton. SCOTLAND: 40%, £25 to £28 ex store.

IODINE.—Resublimed B.P., 6s. 3d. to 8s. 4d. per lb.

LAMPBLACK.—£45 to £48 per ton.

LEAD ACETATE.—LONDON: White, £34 10s. per ton; brown, £1 per ton less. SCOTLAND: White crystals, £33 to £35; brown, £1 per ton less. MANCHESTER: White, £35; brown, £33.

LEAD NITRATE.—£28 to £29 per ton.

LEAD, RED.—SCOTLAND: £24 to £26 per ton less 2½%; d/d buyer's works.

LEAD, WHITE.—SCOTLAND: £39 per ton, carriage paid. LONDON: £36 10s.

LITHOPONE.—LONDON: 30%, £16 to £17 per ton.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—SCOTLAND: £7 per ton.

MAGNESIUM SULPHATE.—Commercial, £5 per ton, ex wharf.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NICKEL AMMONIUM SULPHATE.—£49 per ton d/d.

NICKEL SULPHATE.—£49 per ton d/d.

PHENOL.—6¾d. to 7¼d. per lb. to December 31.

POTASH, CAUSTIC.—LONDON: £42 per ton. MANCHESTER: £36 10s.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. less 5%, d/d U.K. Ground, 5¼d. LONDON: 5d. per lb. less 5%, with discounts for contracts. SCOTLAND: 5d. d/d U.K. or c.i.f. Irish Ports. MANCHESTER: 5d.

POTASSIUM CHLORATE.—LONDON: £37 to £40 per ton. SCOTLAND: 99¾/100%, powder, £37. MANCHESTER: £38.

POTASSIUM CHROMATE.—6¼d. per lb. d/d U.K.

POTASSIUM IODIDE.—B.P., 5s. 2d. per lb.

POTASSIUM NIRATE.—SCOTLAND: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 9¾d. per lb. SCOTLAND: B.P. crystals, 10d. to 10½d. MANCHESTER: B.P., 11¾d. to 1s.

POTASSIUM PRUSSIATE.—LONDON: Yellow, 8¼d. to 8¾d. per lb. SCOTLAND: Yellow spot, 8¼d. ex store. MANCHESTER: Yellow, 8¼d.

SALAMMONIAC.—First lump spot, £41 17s. 6d. per ton d/d in barrels. SCOTLAND: Large crystals, in casks, £36.
SODA ASH.—58% spot, £5 12s. 6d. per ton f.o.r in bags.
SODA, CAUSTIC.—Solid 76/77° spot, £13 17s. 6d. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 5s. in casks, Solid 76/77°, £14 12s. 6d. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £13 5s. to £14 contracts.
SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.
SODIUM ACETATE.—£22 per ton. LONDON: £22. SCOTLAND: £20 15s.
SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. SCOTLAND: Refined recrystallised £10 15s. ex quay or station. MANCHESTER: £10 10s.
SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount 5%. Anhydrous, 5d. per lb. LONDON: 4d. per lot less 5% for spot lots and 4d. per lb. with discounts for contract quantities. MANCHESTER: 4d. per lb. basis. SCOTLAND: 4d. delivered buyer's premises with concession for contracts.
SODIUM BISULPHITE POWDER.—60/62%, £20 per ton d/d 1-cwt. iron drums for home trade.
SODIUM CARBONATE, MONOHYDRATE.—£15 per ton d/d in minimum ton lots in 2 cwt. free bags. Soda crystals, SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality, 7s. 6d. per ton extra. Light Soda Ash £7 ex quay, min. 4-ton lots with reductions for contracts.
SODIUM CHLORATE.—£32 10s. per ton. SCOTLAND: 3⅝d. per lb.
SODIUM CHROMATE.—4d. per lb. d/d U.K.
SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture, £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals, £14 10s. ex station, 4-ton lots. MANCHESTER: Commercial, £10 5s.; photographic, £14 10s.
SODIUM META SILICATE.—£14 per ton, d/d U.K. in cwt. bags.
SODIUM IODIDE.—B.P., 6s. per lb.
SODIUM NITRITE.—LONDON: Spot, £18 5s. to £20 5s. per ton d/d station in drums.
SODIUM PERBORATE.—10%, 9¼d. per lb. d/d in 1-cwt. drums. LONDON: 10d. per lb.
SODIUM PHOSPHATE.—£13 per ton.
SODIUM PRUSSIATE.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5d. to 5⅔d. ex store. MANCHESTER: 5d. to 5½d.
SODIUM SILICATE.—140° Tw. Spot £8 per ton. SCOTLAND: £8 10s.
SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d SCOTLAND: English material £3 15s.
SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 12s. 6d. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 2s. 6d. to £3 5s.
SODIUM SULPHIDE.—Solid 60/62% Spot, £10 15s. per ton d/d in drums; crystals 30/32%, £8 per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 7s. 6d., d/d buyer's works on contract, min. 4-ton lots. Spot solid 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 2s. 6d.
SODIUM SULPHITE.—Pea crystals spot, £13 10s. per ton d/d station in kegs. Commercial spot, £8 15s. d/d station in bags.
SULPHUR.—£9 10s. to £9 15s. per ton. SCOTLAND: £8 to £9.
SULPHATE OF COPPER.—MANCHESTER: £14 2s. 6d. per ton f.o.b.
SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.
SULPHUR PRECIP.—B.P. £55 to £60 per ton according to quantity. Commercial, £50 to £55.
VERMILION.—Pale or deep, 4s. 5d. to 4s. 7d. per lb.
ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.
ZINC SULPHATE.—LONDON: £12 per ton. SCOTLAND: £10 10s.
ZINC SULPHIDE.—10d. to 11d. per lb.

Intermediates and Dyes

ACID, BENZOIC, 1914 B.P. (ex Toluol).—1s. 9½d. per lb.
ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.
ACID, H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.
ACID NAPHTHIONIC.—1s. 8d. per lb.
ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100%.
ACID, SULPHANILIC.—Spot, 8d. per lb. 100% d/d buyer's works.
ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra.
BENZIDINE BASE.—Spot, 2s. 5d. per lb., 100% d/d buyer's works.
BENZIDINE HCL.—2s. 5d. per lb.
p-CRESOL 34-5° C.—1s. 9d. per lb. in ton lots.
m-CRESOL 98/100%.—1s. 11d. per lb. in ton lots.
DICHLORANILINE.—1s. 11½d. to 2s. 3d. per lb.
DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.
DINITROBENZENE.—8d. per lb.
DINITROTOLUENE.—48/50° C., 9d. per lb.; 66/68° C., 01½d.
DINITROCHLORBENZENE, SOLID.—£72 per ton.
DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.
α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.
β-NAPHTHOL.—Spot, £78 15s. per ton in paper bags.
α-NAPHTHYLAMINE.—Spot, 11½d. per lb., d/d buyer's works.
β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb., d/d buyer's works.
o-NITRANILINE.—3ss. 11d. per lb.
m-NITRANILINE.—Spot, 2s. 7d. per lb., d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 8d. per lb., d/d buyer's works.
NITROBENZENE.—Spot, 4½d. to 5d. per lb.; 5-cwt. lots, drums extra.
NITRONAPHTHALENE.—9d. per lb.; P.G., 1s. 0½d. per lb.
SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb.
o-TOLUIDINE.—9½d. to 11d. per lb. *p*-TOLUIDINE.—1s. 11d. per lb.

Wood Distillation Products

ACETATE OF LIME.—Brown, £8 to £9. Grey, £11. Liquor, brown, 30° Tw., 8d. per gal. MANCHESTER: Brown, £11; grey, £13 10s.
ACETIC ACID, TECHNICAL, 40%.—£17 to £18 per ton.
CHARCOAL.—£5 to £10 per ton.
METHYL ACETONE.—46-50%, £43 to £47 per ton.
WOOD CREOSOTE.—Unrefined, 5d. to 1s. 6d. per gal.
WOOD NAPHTHA, MISCIBLE.—2s. 6d. to 3s. 6d. per gal.; solvent, 3s. 3d. to 4s. 3d. per gal.
WOOD TAR.—£2 to £4 per ton.

Coal Tar Products

ACID, CARBOLIC.—Crystals, 6¾d. to 7½d. per lb.; crude, 60's, 1s. 1½d. to 2s. 2½d. per gal. MANCHESTER: Crystals, 7½d. per lb.; crude, 2s. per gal. SCOTLAND: 60's, 2s. 6d. to 2s. 7d.
ACID, CRESYLIC.—90/100%, 1s. 8d. to 2s. 3d. per gal.; pale 98%, 1s. 5d. to 1s. 6d.; according to specification. LONDON: 98/100%, 1s. 4d.; dark, 95/97%, 1s. SCOTLAND: Pale, 99/100%, 1s. 3d. to 1s. 4d.; dark, 97/99%, 1s. to 1s. 1d.; high boiling acid, 2s. 6d. to 3s.
BENZOL.—At works, crude, 9½d to 10d. per gal.; standard motor 1s. 3d. to 1s. 3½d.; 90%, 1s. 4d. to 1s. 4½d.; pure, 1s. 7½d. to 1s. 8d. LONDON: Motor, 1s. 3½d. SCOTLAND: Motor, 1s. 6½d.
CREOSOTE.—B.S.I. Specification standard, 6d. per gal. f.o.r. Home, 3¾d. d/d. LONDON: 4½d. f.o.r. North; 5d. London. MANCHESTER: 5¼d. to 5¾d&. SCOTLAND: Specification oils, 4d.; washed oil, 4¼d. to 4¾d.; light, 4½d.; heavy, 4¼d. to 4½d.
NAPHTHA.—Solvent, 90/100%, 1s. 5d. to 1s. 6d. per gal.; 95/160%, 1s. 6d.; 99%, 11d. to 1s. 1d. LONDON: Solvent, 1s. 3½d. to 1s. 4½d.; heavy, 11d. to 1s. 0½d. f.o.r. SCOTLAND: 90/160%, 1s. 3d. to 1s. 3½d.; 90/190%, 11d. to 1s. 2d.
NAPHTHALENE.—Purified crystals, £10 per ton in bags. LONDON: Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s.; 76/78 quality, £5 10s. to £6. SCOTLAND: 40s. to 50s.; whizzed, 70s. to 75s.
PITCH.—Medium soft, 33s. to 35s. per ton. LONDON: 35s. per ton, f.o.b. East Coast port. MANCHESTER: 32s. 6d. to 34s. f.o.b. East Coast.
PYRIDINE.—90/140, 5s. 6d. to 8s. per gal.; 90/180, 2s. 3d.
TOLUOL.—90%, 1s. 11d. to 2s. per gal.; pure, 2s. 2d.
XYLOL.—Commercial, 1s. 11d. to 2s. per gal.; pure, 2s. 1d. to 2s. 2d.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—Neutral quality basis 20.6% nitrogen delivered in 6-ton lots to farmer's nearest station. £7 5s. per ton, less 10s. 6d. per ton for August delivery.
CYANAMIDE.—£7 5s. per ton delivered in 4-ton lots to farmer's nearest station.
NITRATE OF SODA.—£7 12s. 6d. per ton for delivery in 6-ton lots, carriage paid to farmer's nearest station for material basis 15.5% or 16% nitrogen.
NITRO-CHALK.—£7 5s. per ton in 6-ton lots carriage paid for material basis 15.5% nitrogen.
CONCENTRATED COMPLETE FERTILISERS.—£10 5s. to £10 17s. 6d. per ton according to percentage of constituents, for delivery in 6-ton lots carriage paid.
NITROGEN PHOSPHATE FERTILISERS.—£10 5s. to £13 15s. per ton.

Latest Oil Prices

LONDON, Aug. 7.—LINSEED OIL was steady for forward. Spot, £25 5s. (small quantities); Aug., £22 15s.; Sept.-Dec., £22 10s.; Jan.-April, £22 12s. 6d., naked. SOYA BEAN OIL was steady. Oriental (bulk), Aug.-Sept. shipment, £19 5s. RAPE OIL was steady. Crude, extracted, £31; technical refined, £32 10s. naked, ex wharf. COTTON OIL was quiet. Egyptian, crude, £23 10s.; refined common edible, £27; deodorised, £29, naked, ex mill (small lots £1 10s. extra). TURPENTINE was unchanged. American, spot, 42s. 9d. per cwt.

HULL.—LINSEED OIL, spot, quoted £23 5s. per ton; Aug., £22 15s.; Sept.-Dec., £22 10s.; Jan.-April, £22 10s. COTTON OIL, Egyptian, crude, spot, £23 10s.; edible refined, spot, £26 10s.; technical, spot, £26 10s.; deodorised, £28 10s., naked. PALM KERNEL OIL, crude, f.m.q., spot, £18 10s., naked. GROUNDNUT OIL, extracted, spot, £31; deodorised, £34. RAPE OIL, extracted, spot, £30; refined, £31 10s. SOYA BEAN OIL, extracted, spot, £23; deodorised, £26 per ton. CASTOR OIL, pharmaceutical, 43s. per cwt.; firsts, 38s.; seconds, 35s. COD OIL, f.o.r. or f.a.s., 25s. per cwt., in barrels. TURPENTINE, American, spot, 44s. 9d. per cwt.

Chemical and Allied Stocks and Shares

Current Quotations

THE following table shows this week's Stock Exchange quotations of chemical and allied stocks and shares compared with those of last week. Except where otherwise shown the shares are of £1 denomination.

Name.	August 6.	July 30.
Anglo-Iranian Oil Co., Ltd. Ord.	65/-	59/4½
,, 8% Cum. Pref.	36/6	36/3
,, 9% Cum. Pref.	37/9	37/6
Associated Dyers and Cleaners, Ltd. Ord.	1/10½	1/10½
,, 6½% Cum. Pref.	5/-	4/4½
Associated Portland Cement Manufacturers, Ltd. Ord.	58/6	55/6
,, 5% Cum. Pref.	27/6	27/6
Benzol & By-Products, Ltd. 6% Cum. Part Pref.	2/6	2/6
Berger (Lewis) & Sons, Ltd. Ord.	63/1½	61/3
Bleachers' Association, Ltd. Ord.	5/9	6/-
,, 5½% Cum. Pref.	9/4½	9/4½
Boake, A., Roberts & Co., Ltd. 5% Pref. (Cum.)	21/3	21/3
Boots Pure Drug Co., Ltd. Ord. (5/-)	49/6	49/3
Borax Consolidated, Ltd. Pfd. Ord. (£)	95/-	95/-
,, Defd. Ord.	16/6	16/3
,, 5½% Cum. Pref. (£10)	£11/2/6	£11/2/6
,, 4½% Deb. (1st Mort.) Red. (£100)	£109	£109
,, 4½% 2nd Mort. Deb. Red. (£100)	£104	£104
Bradford Dyers' Association, Ltd. Ord.	9/4½	9/4½
,, 5% Cum. Pref.	11/10½	11/10½
,, 4% 1st Mort. Perp. Deb. (£100)	£85/10/-	£85/10/-
British Celanese, Ltd. 7% 1st Cum. Pref.	26/6	26/6
,, 7½% Part. 2nd Cum. Pref.	24/3	22/3
British Cotton & Wool Dyers' Association Ltd. Ord. (5/-)	5/-	5/-
,, 4% 1st Mort. Deb. Red. (£100)	£91	£91
British Cyanides Co., Ltd. Ord. (2/-)	3/3	3/3
British Drug Houses, Ltd. Ord.	20/-	20/-
,, 5% Cum. Pref.	22/6	22/6
British Glues and Chemicals, Ltd. Ord. (4/-)	6/-	6/-
,, 8% Pref. (Cum. and Part.)	29/4½	29/4½
British Oil and Cake Mills, Ltd. Cum. Pfd. Ord.	48/1½	48/1½
,, 5½% Cum. Pref.	26/3	26/3
,, 4¼% First Mort. Deb. Red. (£100)	£107/10/-	£107/10/-
British Oxygen Co., Ltd. Ord.	116/3	115/-
,, 6½% Cum. Pref.	31/10½	31/10½
British Portland Cement Manufacturers, Ltd. Ord.	90/-	90/-
,, 6% Cum. Pref.	31/-	31/-
Bryant & May, Ltd. Pref.	67/6	67/6
Burt, Boulton & Haywood, Ltd. Ord.	21/3	21/3
,, 7% Cum. Pref.	27/6	27/6
,, 6% 1st Mort. Deb. Red. (£100)	£105/10/-	£105/10/
Bush, W. J., & Co., Ltd. 5% Cum. Pref. (£5)	110/-	105/-
,, 4% 1st Mort. Deb. Red. (£100)	£96/10/-	£96/10/
Calico Printers' Association, Ltd. Ord.	10/7½	11/3
,, 5% Pref. (Cum.)	16/10½	17/6
Cellulose Acetate Silk Co., Ltd. Ord.	10/7½	11/3
,, Deferred (1/-)	1/10½	1/10½
Consett Iron Co., Ltd. Ord.	7/3	7/3
,, 8% Pref.	26/3	25/-
,, 6% First Deb. stock, Red. (£100)	£105/10/-	£105/10/-
Cooper, McDougall & Robertson, Ltd. Ord.	36/3	36/3
,, 7% Cum. Pref.	30/-	30/-
Courtaulds, Ltd. Ord.	56/10½	55/-
,, 5% Cum.	26/3	26/3
Crosfield, Joseph, & Sons, Ltd. 5% Cum. Pre-Pref.	25/-	25/-
,, Cum. 6% Pref.	28/9	28/9
,, 6½% Cum. Pref.	30/-	30/-
,, 7½% "A" Cum. Pref.	30/7½	30/7½
Distillers Co., Ltd. Ord.	93/-	93/-
,, 6% Pref. Stock Cum.	30/6	30/6
Dorman Long & Co., Ltd. Ord.	19/-	18/3
,, Prefd. Ord.	23/9	22/3
,, 6½% Non-Cum. 1st Pref.	22/-	21/3
,, 8% Non-Cum. 2nd Pref.	20/-	19/9
,, 4% First Mort. Perp. Deb. (£100)	£102/10/-	£102/10/-
,, 5% 1st Mort. Red. Deb. (£100)	£105	£104
English Velvet & Cord Dyers' Association, Ltd. Ord.	4/4½	5/-
,, 5% Cum. Pref.	7/6	8/1½
,, 4% First Mort. Deb. Red. (£100)	£70	£70
Fison, Packard & Prentice, Ltd. Ord.	38/1½	37/6
,, 7% Non-Cum. Pref.	31/3	30/-
,, 4½% Debs. (Reg.) Red. (£100)	£106	£106
Gas Light & Coke Co. Ord.	28/3	28/3
,, 3½% Maximum Stock (£100)	£90/10/-	£90/10/-
,, 4% Consolidated Pref. Stock (£100)	£110/10/-	£109/10/-
,, 3% Consolidated Deb. Stock, Irred. (£100)	£90/10/-	£90/10/-
,, 5% Deb. Stock, Red. (£100)	£116/10/-	£116/10/-
,, 4½% Red. Deb. Stock (1960-65) (£100)	£113/10/-	£113/10/-
Goodlass Wall & Lead Industries, Ltd. Ord. (10/-)	12/6	12/6
,, 7% Prefd. Ord. (10/-)	13/1½	13/1½
,, 7% Cum. Pref.	30/-	30/-
Gossage, William, & Sons, Ltd. 5% 1st Cum. Pref.	24/4½	24/4½
,, 6½% Cum. Pref.	30/-	30/-
Imperial Chemical Industries, Ltd. Ord.	35/-	35/3
,, Deferred (10/-)	8/9	8/9
,, 7% Cum. Pref.	33/3	33/3
Imperial Smelting Corporation, Ltd. Ord.	13/6	13/6
,, 6½% Pref. (Cum.)	22/6	22/6
International Nickel Co. of Canada, Ltd. Cum.	$28½	$28½
Johnson, Matthey & Co., Ltd. 5% Cum. Pref. (£5)	95/-	95/-
,, 4% Mort. Deb. Red. (£100)	£98/10/-	£98/10/-
Laporte, B., Ltd. Ord.	112/6	107/6
Lawes Chemical Manure Co., Ltd. Ord. (1/-)	7/6	5/7½
,, 7% Non-Cum. Part Pref. (10/-)	10/-	10/-
Lever Bros. Ltd. 7% Cum. Pref.	31/9	32/-
,, 8% Cum. "A" Pref.	32/3	32/3
,, 20% Cum. Prefd. Ord.	77/6	77/6
,, 5% Cons. Deb. (£100)	£109	£109
,, 4% Cons. Deb. (£100)	£105	£105
Magadi Soda Co., Ltd. 12½% Pref. Ord. (5/-)	1/3	1/3
,, 6% 2nd Pref. (5/-)	6d.	6d.
,, 6% 1st Debs. (Reg.)	£58	£58
Major & Co., Ltd. Ord. (5/-)	7½d.	7½d.
,, 8% Part. Prefd. Ord. (10/-)	9d.	9d.
,, 7½% Cum. Pref.	1/6¾	1/6¾
Pinchin, Johnson & Co., Ltd. Ord. (10/-)	43/6	42/-
,, 1st Pref. 6½% Cum.	33/1½	33/1½
Potash Syndicate of Germany (Deutsches Kalisyndikat G.m.b.H.) 7% Gld. Ln. Sr. "A" and "B" Rd.	£69	£70/10/-
Reckitt & Sons, Ltd. Ord.	115/	115/-
,, 4½% Cum. 1st Pref.	25/-	25/-
Salt Union, Ltd. Ord.	41/3	41/3
,, Pref.	46/3	46/3
,, 4½ Deb. (£100)	£109/10/-	£109/10/-
South Metropolitan Gas Co., Ord. (£100)	£129	£127
,, 6% Irred. Pref. (£100)	£149/10/-	£149/10/-
,, 4% Pref. (Irred.) (£100)	£108/10/-	£108/10/-
,, Perpetual 3% Deb. (£100)	£88/10/-	£88/10/-
,, 5% Red. Deb. 1950-60 (£100)	£114/10/-	£114/10/-
Staveley Coal & Iron Co., Ltd. Ord.	45/-	44/4½
Stevenson & Howell, Ltd., 6½% Cum. Pref.	26/3	26/3
Triplex Safety Glass Co., Ltd. Ord. (10/-)	73/1½	75/-
Unilever, Ltd. Ord.	33/9	31/3
,, 7% Cum. Pref.	34/3	29/3
United Glass Bottle Manufacturers, Ltd. Ord.	42/6	41/-
,, 7½% Cum. Pref.	33/-	33/-
United Molasses Co. Ltd. Ord. (6/8)	20/7½	19/4½
,, 6% Cum. Pref.	23/9	23/9
United Premier Oil & Cake Co., Ltd. Ord. (5/-)	7/-	6/6
,, 7% Cum. Pref.	23/9	23/9
,, 6% Deb. Red. (£100)	£101	£101

Inventions in the Chemical Industry

Patent Specifications and Applications

THE following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Crystallising Borax

CRYSTALS of borax having distinct crystalline faces are obtained by rapidly cooling a borax solution and seeding it with crystals of well-defined form and shape obtained by slowly cooling another borax solution. A 28 per cent. solution of borax is cooled rapidly with agitation from 185° to 135° F. and then seeded with seed crystals produced by crushing to a size larger than will pass through a .0082 inch screen crystals which have been obtained by cooling, by radiation for a period of six days, a 30 per cent. aqueous borax solution. The agitation and cooling is continued without interruption and crystals of definite crystalline form are obtained. (See Specification 423,785, of Borax Consolidated, Ltd.)

Aluminium Fluoride

A CYCLIC process for producing aluminium fluoride comprises heating aluminium fluosilicate at temperatures up to 600° C. to drive off silicon tetrafluoride, combining the latter with hydrofluoric acid, and utilising the fluosilicic acid so obtained to produce aluminium fluosilicate from aluminium oxide or hydroxide to continue the cycle. The production of fluosilicate is effected at boiling temperature using excess of acid, and after cooling and separation from the mother liquor, the fluosilicate is dried below 40° C. prior to its decomposition by heat. Substantially anhydrous aluminium fluoride is obtained, but it may, if desired, be reheated at temperatures between 100-600° C. in an aluminium vessel. (See Specification 421,139 of J. Wilkinson and Son, Ltd., and C. J. Saurin.)

Complete Specifications Open to Public Inspection

VALUABLE LIQUID HYDROCARBONS by the heat treatment of liquid hydrocarbons containing unsaturated compounds or resins or asphalts in the presence of hydrogenating gases, production.—International Hydrogenation Patents Co., Ltd. Jan. 18, 1934. 34785/34.

METALLIC SULPHATES and ammonium sulphates, preparation.—M. Serciron. Jan. 16, 1934. 36696/34.

DERRIS ROOT EXTRACTS and other plant extracts, manufacture.—Chemische Fabrik Marienfelde Ges. Jan. 18, 1934. 1073/35.

ORGANIC MERCURY-SILICON COMPOUNDS, manufacture.—I. G. Farbenindustrie. Jan. 20, 1934. 1129/35.

ORGANIC CONDENSATION PRODUCTS particularly for the treatment of textiles, manufacture and use.—Deutsche Hydrierwerke A.-G. Jan. 16, 1934. 1521/35.

ADHESIVES, manufacture.—I. G. Farbenindustrie. Jan. 16, 1934. 1539/35.

HORMONES, production.—Schering-Kahlbaum A.-G. Jan. 16, 1934. 1540/35.

AZO DYESTUFFS, manufacture.—I. G. Farbenindustrie. Jan. 19, 1934. 1621/35.

CONDENSATION PRODUCTS of totally-hydrolised protein material, manufacture.—I. G. Farbenindustrie. Jan. 18, 1934. 1652/35.

COMPOUNDS CONTAINING ACTIVE HALOGEN, manufacture of stable preparations.—Chemische Fabrik von Heyden A.-G. Jan. 19, 1934. 1859/35.

VEGETABLE FIBROUS MATERIALS using ammoniacal cupric-oxide solution, method of processing.—Heberlein and Co. A.-G. Jan. 22, 1934. 1952/35.

2-METHYL-3-HYDROXY-QUINOLINE-4-CARBOXYLIC ACIDS, manufacfacture.—I. G. Farbenindustrie. Jan. 19, 1934. 1959/35.

BASE-EXCHANGE MATERIALS, manufacture.—Naamlooze Vennootschap Octrooien Maatschappij Activit. Jan. 19, 1934. 1988/35.

MORDANT DYESTUFFS, manufacture.—Durand and Huguenin A.-G. Jan. 22, 1934. 2110/35.

Specifications Accepted with Date of Application

AZO DYESTUFFS, manufacture and production.—J. Y. Johnson (I. G. Farbenindustrie). Dec. 29, 1933. 431,201.

FINELY-DIVIDED CALCIUM CARBONATE and method of producing it. Pittsburgh Plate Glass Co. Jan. 21, 1933. 431,145.

MEANS FOR PROTECTING WOOD against attack by fungus.—Imperial Chemical Industries, Ltd., T. Callan and S. Oakeshott. Jan. 4, 1934. 431,344.

CARBONACEOUS MATERIAL, distillation.—H. J. Holford. Jan. 5, 1934. 431,397.

LEAD AND LEAD ALLOYS, treatment.—A. H. Stevens (National Lead Co.). Jan. 5, 1934. 431,355.

UNSATURATED ESTERS, manufacture and production.—J. Y. Johnson (I. G. Farbenindustrie). Jan. 5, 1934. 431,398.

DYESTUFF PREPARATIONS, manufacture and production.—J. Y. Johnson (I. G. Farbenindustrie). Feb. 24, 1934. 431,278.

REAGENTS AND THEIR APPLICATIONS, manufacture.—Laboratories Française de Chimiotherapie, A. Gviard and G. Sandulesco. March 27, 1933. 431,165.

PIGMENT POWDERS, manufacture.—Soc. of Chemical Industry in Basle. March 27, 1933. 431,168.

CATALYTIC DESTRUCTIVE HYDROGENATION under pressure of solid carbonaceous materials.—International Hydrogenation Patents Co., Ltd. Aug. 29, 1933. 431,435.

ORGANIC CARBOXYLIC ACIDS, process for concentrating.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Nov. 21, 1933. 431,313.

COLLOIDAL CALCIUM MALATE, therapeutic agent and process for making.—Drug Products Co., Inc. Dec. 6, 1933. 431,375.

CHEMICAL HEATING COMPOSITIONS, envelopes or containers.—K. Gutwirth. March 15, 1935. 431,255.

COMPOUNDS CONTAINING A POLYMETHINE CHAIN, production.—J. D. Kendall. Dec. 23, 1933. 431,186-7.

RUSTLESS IRON ALLOYS.—Alloy Research Corporation. Dec. 3, 1932. 431,469.

PROCESS FOR EMULSIFYING OILS, fats, waxes, resins, pitches, asphalts, and the like with water.—R. O. Bratke. Dec. 6, 1933. 431,642.

WETTING AGENTS and the like.—W. J. Tennant (Henkey et Cie). Dec. 7, 1933. 431,682.

MONOAZO DYESTUFFS, manufacture and application.—Imperial Chemical Industries, Ltd., and A. H. Knight. Dec. 8, 1933. 431,564.

CELLULOSE ESTER COMPOSITIONS and articles produced therefrom. A. H. Stevens (Dr. H. P. Staudinger). Dec. 8, 1933. 431,565.

Applications for Patents

(July 11 to 17 inclusive.)

AROMATIC AMINES, manufacture.—W. W. Groves (Deutschen Celluloid-Fabrik). 20375.

DISPERSIONS, manufacture.—W. W. Groves (Deutschen Celluloid-Fabrik). 20376.

WATER-INSOLUBLE AZO DYESTUFFS, manufacture.—I. G. Farbenindustrie. (Germany, July 12, '34.) 19835.

MONOAZO DYESTUFFS, manufacture.—I. G. Farbenindustrie. (Germany, July 14, '34.) 19997.

VINYL ESTERS, manufacture.—I. G. Farbenindustrie. (Germany, July 17, '34.) 20379.

CHLORINATED RUBBER PRODUCTS, manufacture.—Imperial Chemical Industries, Ltd., and A. P. Lowes. 20207.

PRODUCTION OF PRODUCTS from solid carbonaceous materials.—International Hydrogenation Patents Co., Ltd. (Germany, July 31, '34.) 20247.

QUATERNARY AMMONIUM BASES, manufacture.—J. Y. Johnson (I. G. Farbenindustrie). 19850.

POLYMERISATION PRODUCTS, manufacture.—J. Y. Johnson (I. G. Farbenindustrie). 19970, 20188, 20189.

ADJUSTING AGENTS FOR DYESTUFFS.—J. Y. Johnson (I. G. Farbenindustrie). 19971.

VAT DYESTUFFS of the anthraquinone series, manufacture.—J. Y. Johnson (I. G. Farbenindustrie). 19972.

HYDROGEN, manufacture.—J. Y. Johnson (I. G. Farbenindustrie). 20187.

HALOGEN COMPOUNDS, manufacture.—J. Y. Johnson (I. G. Farbenindustrie). 20190.

TRI-CRESYL PHOSPHATE, purification.—J. Y. Johnson (I. G. Farbenindustrie). 20191.

ALKYLENE IMINES, manufacture.—J. Y. Johnson (I. G. Farbenindustrie). 20219.

ACETALDEHYDE FROM GASES, manufacture.—J. Y. Johnson (I. G. Farbenindustrie). 20242.

QUATERNARY AMMONIUM COMPOUNDS, manufacture.—J. Y. Johnson (I. G. Farbenindustrie). 20275.

COLOUR LAKES, manufacture.—J. Y. Johnson (I. G. Farbenindustrie). 20278.

DIPHENYLFLUORINDINE, manufacture.—J. Y. Johnson (I. G. Farbenindustrie). 20279.

CARBON BLACK, manufacture.—J. Y. Johnson (I. G. Farbenindustrie). 20386.

MANUFACTURE OF 3 : 5 : 8 : 10-TETRA-AROYLPYRENES.—Soc. of Chemical Industry in Basle. (Switzerland, July 11, '34.) 19862.

ALIPHATIC ALCOHOLS, manufacture.—Standard Alcohol Co. (United States, Oct. 9, '34.) 20370.

ISOPROPYL ETHER, manufacture.—Standard Alcohol Co. (United States, Dec. 29, '34.) 20371.

Personal Notes

MR. J. H. RICE has resigned from the board of Coal and Allied Industries, Ltd.

DR. FELIX SINGER has become consulting ceramic engineer for the United States Stoneware Co., Akron, Ohio, manufacturer of chemical stoneware. He was formerly associated with Deutsche Ton- und Steinzeug-Werks A.-G., and its subsidiaries, including the General Ceramics Co., New York, resigning that connection a few years ago.

MR. A. R. UBBELOHDE, B.A., B.Sc., formerly Senior Scholar of Christ Church, Oxford, and at present holder of a senior research award of the Department of Scientific and Industrial Research, has been awarded a Dewar Research Fellowship by the Managers of the Royal Institution. Mr. Ubbelohde will take up his new appointment in the autumn. His researches have been largely in physical chemistry, and it is expected that his experience will be valuable in connection with the researches at the Royal Institution on the structure of matter directed by Sir William Bragg.

MR. STANLEY DIXON has been appointed secretary of Midland Tar Distillers, Ltd., in place of the late Mr. Leicester Tunks.

MR. HORACE STANLEY POCHIN, J.P., of Croft House, Croft, Leicestershire, chairman and managing director of F. H. and H. S. Pochin, Ltd., and Pochin Bros., Ltd., left £45,033, with net personalty £42,971.

MR. COLIN METCALF, of Nut Bank, Blackley, Manchester, a director of Metcalf and Co., Ltd., Victoria Chemical Works, Manchester, married Miss Hettie Dobson, younger daughter of Mr. and Mrs. C. H. Dobson, at St. Ann's Church, Manchester.

MR. W. P. MILLER, of Paisley, on his retirement from the Glenfield Starch Works of William Wotherspoon, Ltd., with whom he has been for fully 21 years, was presented with a pair of binoculars and a camera from the employees, while the managing director handed him a cheque. He also received a walking-stick from the secretary of the company.

From Week to Week

THREE THOUSAND EMPLOYEES of the Dunlop Rubber Co., Ltd., Manchester, are this year being paid for their annual holiday.

THE ASSOCIATION OF BRITISH CHEMICAL MANUFACTURERS will hold its annual dinner at the Dorchester Hotel, Park Lane, London, on October 10.

THE COUNCIL of the Mining Institute of Scotland has decided that the general meeting usually held in the Royal Technical College, Glasgow, in August, shall be postponed until October 9.

AMALGAMATED OXIDES, LTD., has acquired the business formerly carried on by the Zinc Manufacturing Company, Ltd. Arrangements have been made whereby the continuity of the business will be maintained.

AT MEETINGS OF SHAREHOLDERS of the British Drug Houses, Ltd., held in London on Wednesday, Mr. C. A. Hill (chairman and managing director) presiding, resolutions were passed by the requisite majorities to increase the capital to £750,000 by the creation of 108,000 new preference shares of £1 each.

NETHERLAND PRODUCERS OF SULPHURIC ACID are anticipating being faced with a considerable surplus, owing to decreased exports of ammonium sulphate and superphosphate. Consideration is being given to plans for the establishment of a large-scale copper sulphate plant.

PRESIDENT ROOSEVELT is expected to send a message to Congress asking for speedy legislation to create a voluntary system of oil control. Agreement has been reached at a White House conference on a compromise Bill providing for Congressional ratification of the Oil States compact, and for the formation of a new Petroleum Administrative Board.

THE INSTITUTE FOR SCIENTIFIC RESEARCH, Italy, is perfecting a plan for utilising waste lubricating oils to destroy mosquito larvæ in the antimalarial campaign. It was found that crank case drainings are not directly effective, and, therefore, a chemical product has been evolved, known as "Antilarval," which, it is claimed, when added to the waste oils, renders them deadly to the larvæ.

THE MINING COMPANY HIBERNIA A.-G., of Herne (Westphalia), which is owned by the Prussian State, has established a subsidiary styled Hydrierwerk Scholven at Gelsenkirchen/Ruhr, to produce oil from pit coal. The hydrogenation is to be made according to the I.G. process. The plants will have an annual capacity of about 125,000 metric tons of petrol. The share capital of the new company aggregates Rm.10,000,000.

THE FIRST OF A SERIES OF AIR RAID PRECAUTION HANDBOOKS, prepared by the Air Raid Precautions Department of the Home Office, has been published by H.M. Stationery Office (6d. net). This handbook ("Anti-gas Precautions and First Aid for Air Raid Casualties") has been written primarily for those who would be engaged on first-aid services for the civil population, and especially members of the St. John Ambulance Brigade, the St. Andrew's Ambulance Association and the British Red Cross Society. It gives a description of the gases and other chemical agents which might be employed in war, and indicates the probable methods of their use. Two types of respirators are described—the general service respirator, as issued to the Navy, Army and Air Force, and the special service respirator, which is a simplified pattern designed mainly for persons employed in civil air raid services.

THE OFFICES OF RIO TINTO CO., LTD., it is announced, will be removed to-day to 11 Old Jewry, London, E.C.2. Telegrams, Rio Tinto, Stock, London. Telephone, Metropolitan 3134 (six lines).

THE ANNUAL GENERAL MEETING of the Chemical Club has been fixed for October 28, at 8 p.m. Nominations for election to the committee must reach Mr. J. Davidson Pratt, hon. secretary, by September 28.

THE CARNEGIE HERO FUND TRUSTEES, at Dunfermline, have awarded a memorial certificate and allowance of 15s. a week to the widow of Wallace Edward Holmes, 55, a foreman chemical worker, of High Street, Queenborough, Kent, killed while attempting to rescue a man fatally gassed in a neutralising tank.

WHEN A BREAD VAN COLLIDED with a motor chemical-conveyer in Eccles New Road, Salford, on August 6, the valves of the container were broken and acid poured into the roadway. The fumes from the spilt acid were blown by the wind for a considerable distance, and several people were overcome and had to receive treatment. The chemical conveyer belonged to H. Crowther and Co., Ltd., of Armley, Leeds.

BRITISH COAL EXPORTERS and the metallurgical industry are likely to be affected by a monopoly announced by the Italian Government. Pit coal, carbon coke, copper, tin and nickel are involved. The decree states that the object is the regulation of the disposition of foreign purchases in relation to the better development of Italian exports. The monopoly will be entrusted to the State Railways Board.

AT THE REQUEST OF THE HOME OFFICE, the Medical Research Council has undertaken to promote investigation into the question whether various volatile substances might injure the health of workers using them under industrial conditions. The Council has appointed the following special committee to assist and advise in this matter: Sir Joseph Barcroft (chairman), Mr. J. C. Bridge, Professor A. J. Clark, Professor A. G. Green, Professor J. A. Gunn, Professor E. H. Kettle, Dr. H. B. Morgan, Mr. J. Davidson Pratt, Mr. D. R. Wilson and Sir David Munro (secretary).

NINETY PER CENT. OF THE EARTHENWARE MANUFACTURERS in the country have joined a new organisation, the Earthenware Association, with a view to eliminating the serious internal competition which developed during the depression. The association has given notice that, owing to increased costs of production, prices of earthenware are advanced by a plusage of 8½ per cent. at foot of invoices, and by certain advances and alterations in base rates and altered terms and conditions. Mr. C. E. Bullock and Mr. Sidney H. Dodd, chairman and secretary respectively of the British Pottery Manufacturers' Federation, are the chairman and secretary of the new association.

THE ADVISORY COUNCIL OF INDUSTRIAL INTELLIGENCE AND RESEARCH in India, at its recent meeting at Delhi, decided to promote research in paint, portland cement, lime, cement, concrete, manufacture of dry cells, and the use of vegetable oils for the lubrication of internal combustion engines. It has further been resolved that in regard to the glass industry, a series of analyses of Indian sands and felspars should be carried out to determine their suitability for glass making, and that a survey of the glass industry should be carried out. The question of industrial standardisation was discussed at length and arrangements were made for the interchange of specifications between Provincial and Central Government Departments.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

(NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

E. HARDMAN, SON AND CO., LTD., Hull, tar distillers, etc. (M., 10/8/35.) Reg. July 25, £1,000 debs.; general charge, subject to mort. *£5,318. Aug. 23, 1934.

K. S. B. MANUFACTURING CO., LTD., London, E.C., pump mfrs. (M., 10/8/35.) Reg. July 25, £450 deb$_2$, to L. L. Robinson, Winwood, Hillside Road, Burnham-on-Crouch; general charge. *£500. July 27, 1934.

Satisfactions

K. S. B. MANUFACTURING CO., LTD., London, E.C., pump mfrs. (M.S., 10/8/35.) Satisfaction reg. July 26, of debs. reg. Aug. 30, 1927, to extent of £250.

County Court Judgments

(NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court Judgments against him.)

MORGAN, J. S. (male), Rodridge Hall, near Wingate, Durham, chemical engineer. (C.C., 10/8/35.) £14 4s. 0d. July 4.

Receivership

OXY-FERROLENE, LTD. (R., 10/8/35.) W. R. Sharp, of 11 Waterloo Place, Pall Mall, S.W., was appointed receiver and manager on July 27, 1935, under powers contained in instruments dated April 2 and 3, 1935.

Companies Winding-up Voluntarily

PONTYPRIDD PALLADIUM CO., LTD. (C.W.U.V., 10/8/35.) By special resolution, July 29. Percy Augustus Hayes, of Alban and Lamb, 12 Pembroke Terrace, Cardiff, appointed liquidator. Creditors' claims to the liquidator by September 3.

Partnership Dissolved

BRAMSON AND EDGEWORTH-JOHNSTONE (Mogens Louis Bramson and Robert Edgeworth-Johnstone), consulting mechanical and chemical engineers, 7, 8 and 9 St. James Street, London, S.W.1, by mutual consent, January 26, 1934. Debts received and paid by Mogens Louis Bramson.

New Companies Registered

British Scientific Apparatus and Chemical Co., Ltd., Sunnyside Works, Wootton, Canterbury, Kent.—Registered July 19. Nominal capital £100. Chemists and druggists, manufacturers of and dealers in salts, acids, alkalis, perfumes, scents, etc. Directors: Winifred G. Large, Ronald L. Gower.

Edward Worringham & Co., Ltd., Worringham's Wharf, Blackhouse Road, Deptford, London, S.E.—Registered July 9. Nominal capital £1,000. Dealers in and manufacturers and refiners of oils, greases, fats, glycerine, chemicals and other similar and allied substances, etc.

Manesty Machines, Ltd., Manesty Buildings, College Lane, Liverpool, 1.—Registered July 29. Nominal capital £100. Manufacturers of, agents for and dealers in pharmaceutical and chemical machinery, preparations and articles, etc. Permanent governing director, Edwin Thompson (director of Thompson and Capper Wholesale, Ltd.).

Petrographic Coal Processes, Ltd., 42 Gracechurch Street, E.C.—Registered as a private company on July 24. Nominal capital £100. To acquire certain inventions from Karl Lehmann relating to an improved process for dressing or grading coal, and from Julius Geller relating to an improved process for the low-temperature carbonisation of coal, to adopt agreements with (1) Karl Lehmann, (2) Julius Geller, and (3) The Rt. Hon. Earl of Halsbury; to carry on the business of distillers, extractors, producers, manufacturers and suppliers of solid, liquid and gaseous substances or matter derived from coal or from derivatives or residuals thereof, manufacturers of and dealers in tar, sulphate and other forms of ammonia, oils and chemicals, etc. A subscriber: H. W. Brown, 72 Felstead Road, Orpington.

Research Trust, Ltd.—Registered July 19. Nominal capital, £15,750. To acquire the business carried on by the Research Trust, Ltd. (in liquidation) and to carry on the business of technical industrial, wholesale, retail, manufacturing, consulting and research chemists, experimenters and developers, etc. A subscriber: Dorothy A. E. Bowler, 2 Crowther Grove, London, S.E.22.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

India and Burma.—A European manufacturers' representative in Calcutta is desirous of obtaining commission agencies for pharmaceutical chemicals for India and Burma. (Ref. No. 140.)

Austria.—An agent established at Vienna wishes to obtain the representation, on a commission basis, of United Kingdom manufacturers of perfumeries, cosmetics, chemicals, etc. (Ref. No. 146.)

Lithuania (Klaipede).—A firm in Memel desires to secure the representation for that territory, on a commission basis, of British manufacturers and suppliers of chemicals and drugs. (Ref. No. 152.)

Company News

Monsanto Chemical Co.—The net profit for the six months ended June is $1,848,449, equal to $1.90 a share.

Yorkshire Dyeing and Proofing Co.—For the year to June 30 last, after providing for depreciation and tax, there was a profit of £20,809, compared with £29,481 in the previous year. A sum of £7,500 is appropriated to reserve, against £15,000 last year. The dividend is maintained at 7½ per cent., less tax. This payment absorbs £14,250, and the balance of £5,364 is carried forward.

Broken Hill Proprietary Co.—A substantial increase in net profits is reported for the year to May 31 last. Preliminary figures cabled from Melbourne show that, after providing £541,949 for depreciation and £26,241 for debenture interest, net profits total £670,442. This is an increase of £242,854 on the figure of £427,588 earned last year.

W. & H. M. Goulding.—The report for the year to June 30 last shows net profits, including dividends from subsidiaries and investments, and after making provision for discounts on outstanding accounts, £32,613, compared with £32,106 the previous year. Final dividend is 3 per cent., making 6 per cent. (same), and £6,000 is carried to depreciation account. The amount carried forward is £4,815, against £3,977 brought in.

Du Pont De Nemours.—The net income, after income tax, of E. I. Du Pont de Nemours and Co. and its subsidiaries for the first half of 1935 amounted to $17,451,762, against $18,554,875 in the first half of 1934. After adding $4,998,723 (unchanged) received on the investment of 10,000,000 common shares (carried at $16.20 a share) of the General Motors Corporation and allowing for debenture interest there is a balance applicable to common stock of $19,171,692 (against $20,276,756), the amount earned on each share of common stock being $1.74 (against $1.86). The dividends actually paid on the common stock were $1.30 a share (against $1.15). On June 30 the balance on surplus account totalled $188,531,678. Current assets totalled $123,096,644, against current liabilities of $17,813,477.

Books Received

Economic Conditions in Czechoslovakia, April, 1935. Report by H. Kershaw. London: H.M. Stationery Office. Pp. 61. 2s.

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CHARCOAL, ANIMAL and VEGETABLE, horticultural, burning, filtering, disinfecting, medicinal, insulating; also lumps ground and granulated; established 1830; contractors to H.M. Government.—THOS. HILL-JONES, LTD., "Invicta" Mills, Bow Common Lane, London, E. Telegrams: "Hill-Jones, Bochurch, London." Telephone: 3633 East.

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COPPER Jacketed Jam Boiling Pan, 40 gallons; 60-gallon Copper Jacketed Vacuum Pan and Pump: Werner Universal Mixer, 2 cwt. capacity, "Z" blades: 25-gallon Brass Paste Mixer: small Filter Press.
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York House, 12 York Street, Manchester.
Telephone: 2517 and 2518 Central, Manchester.
Telegrams: "Russonken, Manchester."
And Bardon Chambers, 13 Infirmary Street, Leeds, 1.
Telephone: 26154.

PATENTS & TRADE MARKS

(2d. per word; minimum 18 words; 3 or more insertions, 1½d. per word per insertion. Sixpence extra is charged when replies are addressed to box Numbers.)

PATENTS obtained, trade marks and designs registered, at home and abroad.—GEE AND CO. (Patent and Trade Mark advisers to THE CHEMICAL AGE), 51-52 Chancery Lane, London, W.C.2. Telephone: Holborn 1525. Established 1905.